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Guest Editorial

Medical Society Prepayment Plans

IN the swiftly changing world of today many roads are open but the one marked status quo is closed. If the medical profession does not choose where it will go, less competent powers will choose for it.

The American Medical Association through its House of Delegates and some twenty state medical societies has already chosen the road of medical society prepayment plans. It is not an easy highway. It is an almost uncharted track through difficult and little known territory. But medicine has been hewing out that sort of hard passages for many centuries in its campaign against disease. There have always been quislings and quacks who claimed to know easier and more pleasant ways than those mapped by the physicians.

Politicians know that the achievements of medicine have made medical care one of the most highly prized assets of modern civilization, and they are now trying to grab that asset and use it as trading stock for votes and political power. The medical profession knows that medical care so-used loses much of its value.

Medical society prepayment plans offer a way to put this asset at the service of the public, without thus destroying its value. The medical profession is little interested in methods of payment if these are sufficient to maintain medical education, research and the other elements which have made American service the most effective in the world in fighting disease. That profession is interested to see, in the words of the first of the Ten Principles adopted by the House of Delegates, that "all features of medical service in any method of medical practice should be under the control of the medical profession". With that principle assured medical societies have whole heartedly cooperated with almost every type of social organization, and have greatly improved both medical service and administration under public health, workmen's compensation, care for the indigent, maternal and child health care, Farm Security Administration and almost innumerable local organizations. Even though financial arrangements were often unsatisfactory, the medical profession insisted that the service should be under medical control and be kept up to professional standards. The difficulty in doing this suggests one reason for starting prepayment plans by a medical society. Political and lay prepayment plans fix their income by what taxation will be borne or what subscribers will pay, and then cut the service to fit the available

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cash, usually also cutting the physicians' income below what will maintain standards while nearly always promising a "complete medical service", depending upon the incapacity of patients to judge the service to get away with the deception.

Whenever the administration and standards of any phase of medical care have been entrusted to politicians or persons untrained in medical science and art, or wherever financial management has encroached upon the control of medical service that service has deteriorated and the sick have suffered. This was true of public health, of institutions for the mentally diseased, and of whole nations under compulsory sickness insurance.

Medical society prepayment plans dare not deceive the public. They must meet equally the difficult problem of determining just what premiums can be collected and then just what service can be given for these premiums and finally just how this relation can be fully and honestly explained to the subscribers. Because this is but one of many hard problems of an honest effort to conduct a prepayment plan there have been many experiments, some of which failed, and numerous first mistakes to correct, so that some have grown fainthearted in the fight to organize and conduct such plans.

Yet in a short time about 600,000 persons have received the medical protection of these plans and the number of plans and subscribers grows daily. So greatly do prepayment plans giving an honest medical service change the desire and demand for medical care that figures based on plans with a fixed premium and more or less secretly restricted service furnish little useful acturial information. Only experiments with medical society service prepayment plans can determine just what services can be honestly promised and then actually given when the medical care is maintained at the high professional standards demanded in medical society plans.

Today much experimenting has been done by plans now in operation and many of the facts required both for successful financial operation and satisfactory service to subscribers have been determined. It is now a question of development during the short time that the road is still open for choice between political or lay controlled plans, and those in which medical standards are established and maintained, as they always have been established and maintained by the medical profession. Medicine still has a chance to choose, but that chance is disappearing.

Events in nearly all the countries involved in this global war have forecast extensive social changes when the eagerly awaited peace arrives. Medical arrangements will not be isolated from those changes nor can organized medicine remain indifferent to them without risking the achievements of many centuries. Moreover, since medicine is the social trustee of public health it can reject this opportunity and duty only by betraying that trusteeship.

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Floral Eponym

The lovely gardenia, Gardenia Jasminoides, is named after Dr. Alexander Garden (1728-1792) of Charleston, S. C. He was a successful practioner of medicine and an enthusiastic botanist. His letter to John Batram is often quoted, "Think that I am here, confined to the sandy streets of Charleston where the ox, where the ass, and where men, as stupid as either, fill up the vacant space, while you range the green fields of Florida," it was John Ellis, the botanist, who named the beautiful Cape Jessamine "Gardenia" in his honor.

SYMPOSIUM ON THE SULFONAMIDES*

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HOW ARE THE SULFONAMIDES USED IN THE TREATMENT OF PNEUMONIA AND WHEN IS SERUM THERAPY THE TREATMENT OF CHOICE? CAN THEY BE USED TOGETHER?

DR. BLANTON: With all that you know about pneumonia it is perhaps a *cliché* to begin by saying that chemotherapy is highly effective in the treatment of the disease. The preserum mortality was around 25 per cent. Serum halved it. The sulfonamides quartered it. Our Pneumonia Commission's figures for Virginia for the last two years show among 395 drug treated cases a fatality of 6.6 per cent.

The sulfonamides useful in the treatment of pneumonia are sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine. The pneumonias we are interested in are caused by the pneumococcus, Streptococcus hemolyticus, staphylococcus aureus, influenza bacillus, and Friedlander's bacillus. In pneumococcus pneumonia sulfapyridine, sulfathiazole, and sulfadiazine are all effective. Since sulfadiazine is the least toxic, it is the drug of choice. In Streptococcus hemolyticus pneumonia sulfanilamide, sulfathiazole, and sulfadiazine are all effective. Again on account of low toxicity sulfadiazine is the drug of choice. In Staphylococcus aureus pneumonia either sulfathiazole or sulfadiazine is good. In influenza bacillus pneumonia both sulfapyridine and sulfathiazole are used. In Friedlander's bacillus pneumonia type A sulfadiazine is used and in type B sulfapyridine is used plus specific antisera.

After diagnosis of pneumonia is made, in the average case one should proceed as follows:

1. Collect all specimens for laboratory examination (especially sputum) before giving the drug.
2. Give 4 gm of sulfadiazine immediately.
3. Follow with 1 gm every four hours until temperature is normal for 72 hours.
4. Change to a better drug if bacteriologic studies indicate.
5. If in 48 hours there is no improvement, consider stopping the drug.
6. Switch to a specific antiserum if drug proves too toxic.
7. Give specific antiserum in addition to the drug when
   a. a bacteremia fails to respond in 36 hours.
   b. more than one lobe is involved.
   c. pregnant.
   d. over 50 years old.
   e. seen late in disease (after 3 days).

Sulfonamide therapy in pneumonia can fail. Success depends upon an awareness of what may go wrong; for example, (1) low blood and tissue levels (from poor absorption or rapid elimination), (2) sensitivity of the patient (exhibited in skin, blood, nervous system, fever, and vomiting, etc.), (3) crystallization in the kidney (with anuria and hematuria), and (4) an etiologic organism not affected by the sulfonamides.

It is not enough to give initially 4 grams of sulfadiazine followed by 1 gram every four hours until

*A meeting of the Richmond Academy of Medicine held September 22, 1942, was devoted entirely to a discussion of the sulfonamides as they are employed in the various fields of medicine. Dr. William H. Higgins acted as the interrogator and a number of specialists discussed the questions as they were propounded.

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the temperature is normal in every case of suspected pneumonia. Accurate bacteriologic diagnosis, constant observation of the patient, meticulous attention to the blood count, cultures, and drug levels, as well as repeated studies of the urine are essential to success.

OF WHAT VALUE ARE THE SULFONAMIDES IN MENINGITIS, INCLUDING TUBERCULAR MENINGITIS?

DR. STERN: In discussing the topic: Of what value are the sulfonamides in meningitis, including tubercular in children, it seems most practical to cite my present beliefs based on a modest experience and some study of the literature. For brevity, authorities and publications are not formally quoted.

When a lumbar tap is done on a child, on proper indications, and reveals a fluid which suggests meningitis, there is usually some time lost till the exact causative organism or strain is identified. It is relatively safe and good medical practice to inaugurate sulfonamide therapy in order to attack the process as soon as possible. For this purpose, sulfanilamide, sulfapyridine, and sulfadiazine are all useful, sulfathiazole much less so because it is not as diffusible and hence its concentration in the spinal fluid is much less in relation to the blood. Some does get in the central nervous system though, in spite of earlier reports to the contrary. There is very variable testimony as to the relative concentrations of the other three in the spinal fluid and blood. A concensus seems to be 20-30% for sulfanilamide; 50% for pyridine, and up to 80-100% for diazine. These percentages are still open to question.

In cerebro-spinal meningitis, conservative clinicians choose the weapons of the sulfonamide plus the serum or antitoxin or both—with spinal taps as indicated for intrathecal therapy, etc. More advanced, not to say radical, authorities are content to tap only once for diagnosis. They then give the sulfonamide per os, intravenously or subcutaneously and do completely without specific sera. Recovery rates are equally good. The dosage is from 1½ to 3½ gr. per pound of body weight per 24 hours. This is reduced as the patient improves and discontinued 48 hours after fever is gone or the spinal fluid is sterile or the count is satisfactory.

The same general procedure is used in the secondary or so-called purulent meningitis.

In influenzal infection use sulfapyridine or diazine with "B" type horse or beta rabbit serum intrathecally. Human or guinea pig complement adds to the effectiveness.

In streptococcic cases—sulfanilamide or diazine.

In pneumococcic cases—sulfapyridine or diazine, with occasional help of specifically typed sera and intrathecally the sodium salt of hydroxylethylapocuprein hydrochloride, (℞71) for short.

Staphylococcic meningitis is not materially affected by the sulfonamides. Diazine may be used with ℞71 intrathecally and staphylococcic antitoxin intravenously.

The rarer organisms, typhoid, gonococcus, salmonella groups, B coli, etc., have had no significant series reported but many isolated cases have recovered and the sulfonamides are indicated.

The drop in red cells and hemoglobin which results from intensive sulfonamide therapy can be met by transfusions. Oddly enough, leucopenia and agranulocytosis have not been of common occurrence. Because of the practical difficulties in administration of the drug in infants, a valuable paper has just been published. It has been possible without untoward reactions locally to give 27 infants 50 injections subcutaneously of 5% sodium sulfadiazine in distilled water and secure thereby excellent, prompt and well maintained sulfa blood levels. Since these little patients present difficult veins and stomachs this overcomes a common handicap to sufficiently thorough treatment.

Promin has been used in tubercular meningitis but still belongs in the one case class of remedies. It is worth trying with such a desperate prognosis.

The snags encountered in heavy sulfonamide therapy have been poor tolerance (diazine seems best), heavy crystals in urine (in one case causing almost an anuria), and severe nephritis in which complicating infections may have been as much an etiological factor as the drug. A case was reported with 25 mgm. concentration in the spinal fluid, without appreciable damage to the patient.

CAN X-RAY THERAPY BE GIVEN WITH SAFETY WHEN THE SULFONAMIDES ARE BEING USED—(A) LOCALLY? (B) GENERALLY?

DR. TABB: The question as to whether X-ray therapy can be given with safety during the administration of the sulfonamides cannot be answered definitely at the present time. There is very little

to be found in the literature on this subject. Kelly of Omaha, Nebraska, who is a great advocate of X-ray therapy in peritonitis and gas gangrene, does not use the combination of these two curative agents, but invariably postpones X-ray treatment for twenty-four hours after the withdrawal of the drug and he seems to feel that, even when this is done, the patients do not derive the usual beneficial effects as those to whom the drug has not been administered at all.

M. B. Marks of Miami Beach, Florida, reported two children both with septic sore throats and cervical glandular enlargements whom he feels reacted rather violently to X-ray therapy to the glands. It seems to be his impression that these children would not have had the severe swelling of the glands and fever that they did, had the X-ray treatment been used alone. He cites Epstein as having demonstrated that the skin of people under sulfanilamide is more sensitive to ultra-violet rays.

One dermatologist whom I consulted does not hesitate to use 85KV unfiltered therapy to the skin in connection with the sulfonamide ointments or the usual oral administration. One roentgenologist sees no reason why such lesions as carbuncles, boils, etc., should not be treated while patient is under these drugs. Another roentgenologist is still skeptical of the combination. He has given X-ray therapy eight hours following the administration of the drug, but admits that the serious condition of the patient warranted taking any reasonable chance. Another roentgenologist feels that he would not prefer to administer X-ray therapy in connection with the sulfonamides until further definite data is available. It is my impression that most roentgenologists would be somewhat doubtful at the present time of the advisability of delivering as much as 200 R units with heavy filtration of say 2 mm of copper to the abdomen of a patient whose blood was saturated with one of these drugs.

WHAT INSPIRATORY INFECTIONS (COMMON COLD INCLUDED) ARE AMENABLE TO SULFONAMIDE THERAPY? WHAT IS THE INDEX FOR DETERMINING THE USE OF THE DRUG IN SUCH CONDITIONS?

DR. BEACH: There have appeared in recent months several articles from institutions giving the results of their experiments in regard to the sulfonamide drugs in the treatment of the above conditions. These results are apparently encouraging, but with the available literature at hand at the present time I feel that their use in such conditions is definitely contraindicated and for the following reasons:

1. These drugs, as we all know, are not without danger and I do not feel that we are justified in giving the patient such a drug for a condition which is as mild and self-limiting as the above.
2. Practically all of these patients are treated at home and this makes laboratory check-ups impracticable; some few don't even stop work.
3. There is a possibility of sensitizing the patients to these drugs and when they are definitely indicated the patient is unable to take them.

WHY ARE THE SULFONAMIDES OF NO VALUE IN TREATING A CERTAIN SMALL PERCENTAGE OF CASES OF GONORRHEA? IS THERE A LOCAL TREATMENT? HOW DOES THE DRUG EFFECT A CURE, PARTICULARLY IN THE "ONE DAY" TREATMENT?

DR. WASHINGTON: This question has never been answered except by theory. My idea is that just as there are many strains of the streptococcus, there are also many varieties of the gonococcus. We know that certain strains of the streptococcus are killed by the sulfonamides while other strains, notably the streptococcus fecalis and viridans are resistant to the drug. I believe the effect on the gonococcus is similar. This could explain why sulfanilamide lost its efficacy in gonorrhea. Due to its widespread use in this disease it could have killed out certain strains of the germ and left resistant strains for propagation. Fortunately however, sulfathiazole continues to be effective in about 90 per cent of the cases of this disease.

So far as I know the sulfonamides have never been used locally in gonorrheal urethritis. There is one point I should like to make, though it might seem a digression, in regard to the use of local treatment. It is very foolish to push the use of the sulfonamides, switching from one to another and hoping for good results, when all the time the patient is not improving. This patient has a sulfonamide resistant infection and usually has prostatitis or some other complication. The drug should be discontinued and prostatic massage and other

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suitable local treatment instituted.

The sulfonamides work both through the blood stream and in the urine to produce a cure.

The newspapers recently carried an article headed "Gonorrhea Cured in One Day," or words to that effect. The basis for this was an article by Captain J. P. Pappas in the June issue of the "Military Surgeon". The author gave one massive dose 5 to 7 grams, of sulfathiazole to a small series of patients and reported 82 per cent cures. These patients were well in an average of 5 days and remained well. The only reaction was transient nausea.

I feel that this is a valuable contribution, but the newspaper publicity given it could very well serve to minimize in the lay mind the danger of venereal disease.

WHAT ARE THE USES OF SULFONAMIDE IN THE TREATMENT OF INFLUENZA

DR. CHAPMAN: In the past many etiological factors have been considered the cause of epidemic influenza. There is no doubt at the present time as to the cause of influenza, and an etiological diagnosis is possible.

The relation of a specific filtrable virus seems clearly established for at least one form of epidemic influenza. The virus can be isolated by spraying washings of the nasopharynx into the nares of ferrets, from which the true strain can be obtained. It has also been possible to culture the virus from the membranes of the chick embryo, which serves for its primary isolation. It is thus different from the virus of the common cold, which apparently will not develop under these conditions. The virus of epidemic influenza is rarely encountered in sporadic cases and there are various types of this virus.

In sporadic outbreaks, it is often difficult to identify the disease as influenza. Respiratory diseases of all types, and even some non-respiratory diseases have been loosely called influenza, most commonly the "flu", which seems to cover a wide variety of clinical forms, including the common cold in both epidemic and sporadic forms. Such terms as grippe, intestinal grippe, and so-called Devil's grippe have been used since the epidemic of 1918 to cover a multitude of minor infections which have no relation to virus influenza.

I am sure a great variety of such disorders have been treated with the sulfonamides for influenza, and naturally the results have been variable.

The sulfonamides have not proven of value in virus borne diseases and therefore have no place in the treatment of epidemic influenza.

In the treatment of the sequelae due to secondary invaders following epidemic influenza, the sulfonamides are of greatest importance, and offer the only hope of recovery in the majority of cases of influenza meningitis which is caused by the influenza group of organisms.

WHAT ARE THE USES OF THE SULFONAMIDES IN EAR INFECTIONS AND MASTOIDITIS?

DR. PASTORE: To thoroughly understand the results of sulfonamide therapy in middle ear and mastoid infections it is necessary to bear in mind two important factors, (1) the anatomical and structural elements involved and (2) sulfonamide therapy is not as effective in inflammatory bone lesions as in soft tissue.

In summary: (1) Sulfonamide therapy in ear and mastoid infections is most useful when used during the invasive stage of the infection. It is least useful in the suppurative stage and when thrombophlebitis is associated with the original focus of infection.

(2) Personal experience and a partial review of the more recent otological literature tend to favor sulfadiazine as the drug of choice. Sulfathiazole, sulfanilamide and sulfapyradine are used depending on the type of infection predominating and the experience of the individual physician.

(3) It is important that the dosage of the drug be adequate in the early stages of the disease. As a rule it is desirable to maintain a blood level of the drug between ten and twenty mg. per cent. The severity of the infection and the patient's course serve as an index in determining the point at which the blood level should be maintained.

Effect on specific conditions:

(1) Sulfonamides are most useful where cellulitis or erysipelas is associated with external otitis.

(2) The constant draining ear is resistant to sulfonamide therapy particularly those in the type three and type four class.[1] This is as would be expected.

(3) Acute otitis media due to the organisms streptococcus hemolyticus or pneumococcus type three

responds very well to sulfonamide therapy in the very acute stage.

(4) Every case of acute otitis media is a potential case of mastoiditis (except where complete mastoidectomy has previously been performed), therefore one cannot say how often an early mastoiditis is aborted by the use of the sulfonamides. However, if adequate sulfonamide therapy is instituted before the third day of acute mastoiditis the result is uniformly good. When the disease has been present for more than a week before the sulfonamides are administered, resolution of the disease is less likely as each day passes before initiation of the drug.

During the first six months of 1942, nineteen mastoid operations were performed in the Medical College of Virginia Hospitals. Five of the nineteen patients had received inadequate sulfonamide therapy before admission but none before complications of mastoiditis were manifest. In only one of the nineteen patients was the disease limited to the middle ear and mastoid bone. The remaining eighteen all had one or more complications of mastoiditis on admission.

REFERENCE

(1) Lillie Classification.

How Should the Drug Be Used in Patients with Known Renal Impairment? Is There Apt to be Greater Incidence of Renal Calculi Due to the Use of These Drugs? What is the Drug of Choice in the Treatment of Chronic Urinary Tract Infection?

DR. DODSON: Renal function tests should be done to determine as accurately as possible the degree of renal damage. The dose of the drug should be reduced depending upon the functional capacity of the kidney and when possible daily determinations of the blood level of the drug should be done. When the function of the kidneys is impaired the drug is not readily eliminated and a toxic amount may accumulate in the blood stream.

The concretions formed by crystalline deposits of the drug are not true calculi. If the patient survives they pass again into solution and cause no demonstrable injury to the kidney. I had a patient recently treated for anuria resulting from sulfathiazole crystals who had normal renal function and normal excretory pyelograms a few weeks following his illness.

The drug of choice depends somewhat upon the type of organism causing the infection. Infection caused by the Bacillus coli group of organisms is effectively treated by sulfanilamide, sulfathiazole, or sulfacetamide. Sulfacetamide is somewhat less toxic in my experience, consequently it is preferred. Sulfanilamide and sulfathiazole are the only chemotherapeutic agents effective in the treatment of infections caused by the Bacillus proteus. Sulfathiazole is less toxic than sulfanilamide to most patients. Staphylococcic infections respond better to sulfathiazole than to any other drug. The streptococcic infections, except those caused by the streptococcus foecalis, respond better to sulfanilamide. The streptococcus foecalis is not affected by these drugs. For practical purposes when bacteriological studies are not convenient, sulfacetamide will be found quite effective in the treatment of infection with acid urine. The colon group of organisms predominate when the urine is acid. When the urine is alkaline the organisms are apt to be staphylococci or proteus bacilli and sulfathiazole is the drug of choice.

What Is the Present Status of the Use of Sulfonamides in Gastro-Intestinal Infections? Are the Benefits in Relation to the Concentration in the Blood or to the Direct Action of the Drug?

DR. DAVIS: A number of articles have appeared recently by Lyon and by Marshall and his coworkers on the use of sulfonamides in bacillary dysentery. These have dealt with sulfaguanidine and results have seemed to be encouraging but my experience in a few cases has not been satisfactory. A recent report on the use of sulfathiazole would seem to be more promising as I feel that the absorbable drug stands a better chance to get at the organisms in the mucosa.

The drugs have been extensively tried in nonspecific ulcerative colitis with variable results. My personal experience leads me to feel that they are helpful to quiet down the acute flare up in which secondary infection seems to be a large factor. In the chronic stage the drug appears to be useless.

Typhoid fever is not influenced favorably by any of the varieties of sulfonamides and it has been

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suggested that these cases may be made worse. Amebic dysentery is not helped.

Recent reports suggest that the organism of Asiatic cholera may be influenced in vitro but reports of its clinical use have not come to my attention.

Acute diverticulitis of the colon may be favorably influenced by the absorbable forms but attempts to treat acute appendicitis with these drugs should be condemned. They have no effect in peptic ulcer.

In answer to the second part of my question, I believe that the slightly absorbable sulfaguanidine or sulfasuxidine should be used when the aim is to influence the bacterial flora of the intestinal content, but when infection in the bowel wall is to be dealt with the absorbable forms which give a satisfactory blood concentration should be used.

WHAT ARE THE USES OF THE DRUGS IN EMPYEMA? IN PERITONITIS LOCALLY AND SYSTEMICALLY? RATE OF ABSORPTION FROM THE PERITONEUM? HAS SULFASUXIDINE BEEN USED INTRAPERITONEALLY?

DR. DANIEL: In order to cover so many questions in the four minutes allotted me I will attempt to answer them together. The complications of pneumonia and consequently the incidence of post pneumonic empyema have apparently been decidedly decreased since the advent of sulfonamide therapy. Sulfathiazole has been used with favorable results in certain types of coccal empyema when used topically. Here it must be noted that the rate of absorption of the sulfonamides varies considerably when used in exudative areas, such as abscess cavities, as compared with noninfected or very recently contaminated areas, such as clean peritoneal cavities or freshly contaminated wounds.

Haag et al of the Medical College of Virginia have very beautifully shown by canine experiments the absorptive rate and comparison of the absorption of sulfanilamide and sulfathiazole. When doses of 100 mgm. per kilo were administered by mouth, by peritoneum, and by pleura, the peak of absorption occurred in one to two hours; the sulfathiazole peak occurred in two hours with 3 to 5 mgm. per cent blood concentration and sulfanilamide's peak occurred in one hour. With both drugs the pleural route absorption was slightly faster. With both drugs the blood concentrations gradually decreased to disappear in 24 hours. Of course, these experiments were with dogs, but clinically the results have apparently been confirmed.

We have used both sulfanilamide and sulfathiazole both locally and systemically in peritonitis. The maximum adult dose of 9 gms is applied locally and the blood determination obtained the following day if further administration is desired. Sodium sulfathiazole intravenously may be given after calculations made. In abscess cavities the absorption of the drugs will be very slight. When used locally exudate from appendiceal cavities may show 200 mgm. per cent and the blood concentration very slight.

I know of no case where sulfasuxidine has been used in the peritoneal cavity. Sulfasuxidine has supplanted sulfaguanidine as an intestinal antiseptic and particularly as a preoperative adjunct for intestinal surgery. There is very little absorption from the intestinal tract and subsequently practically no toxicity. The usual gram dose every four hours may be given many days with no ill result. Experiments have been reported where the bacterial count in one gram of fecal matter has been reduced from ten million to 100 after several days of oral four-hour gram doses of sulfasuxidine preoperatively in resection of the colon for carcinoma; but we must not forget that even before its use, it was a rare occurrence to have an infection following primary resection of the colon.

WHAT ARE THE SPECIFIC VALUES OF THE VARIOUS SULFONAMIDE OINTMENTS AND SOLUTIONS NOW ON THE MARKET? IS THE DRUG USED INTERNALLY IN DERMATOLOGIC PRACTICE?

DR. MURRELL: A large percentage of cases coming to a dermatologist consist of irritations secondarily infected. Necessarily the infection is the first concern and the ideal remedy will be an antisepic with no tendency to irritate. Practically all of the older antiseptics are irritants and add to the dermatitis. This is true, only in a small degree with the sulfonamides locally applied and constitute their chief usefulness.

The efficiency of the sulfonamides, particularly sulfathiazole, as a local antiseptic has been amply proven in the recent work of Pillsbury, Dennie and others. There is some difference of opinion as to the best base to use, some feeling that a grease base is an interference and using special bases which

are disappearing. The best dosage is also still undetermined but a general average, as far as sulfathiazole is concerned, is 5 per cent ointment which has proven efficacious.

WHAT ARE THE ALLERGIC FACTORS IN SULFONAMIDE THERAPY?

DR. VAUGHAN: Drug allergens can produce practically any of the common allergic manifestations. Some drugs appear to have a tendency to produce one or another more freqently. Aspirin for example is especially likely to cause asthma, urticaria or angioneurotic edema. Barbiturates frequently cause morbilliform or purpuric eruptions. The characteristic allergic skin reaction to digitalis is with a scarlatiniform rash. Arsenic compounds, especially the arsphenamines, are prone to cause exfoliative dermatitis. Granulopenia is characteristic of aminopyrine sensitization. Fever is a characteristic at one time or another of all drug sensitizations and it is this symptom in particular which separates drug allergy from food and inhalant allergy.

The sulfonamides can produce any of the above allergic symptoms. Here again fever is an outstanding reaction because the sulfonamide drugs are customarily used in the treatment of febrile diseases and drug fever may be overlooked or confused with fever due to the existing infection.

The sulfonamide group of drugs represents one of the outstanding advances of medicine. It is unfortunate that sensitization to these drugs occurs so frequently. Fifteen per cent of those receiving sulfanilamide and 33 per cent of those receiving sulfathiazole become sensitized. It makes no difference whether the drug is given continuously over a long period or whether it is given intermittently. Sulfadiazine produces sensitization. So far it appears to be less highly allergenic than the other two but it should be borne in mind that we have not used it as long.

Sensitization to one of these drugs may remain specific for that drug or may result in sensitization to several or to all. One recent case for example, developed allergic intolerance to sulfanilamide, sulfathiazole and sulfadiazine but was able to take sulfapyridine.

There are no reliable tests for determining sensitization. Patch tests, scratch tests, endermal, passive transfer and precipitin tests are of no value. Even the history is of no help. A person with no previous history of allergy appears to be just as likely to develop sensitization as one with a strong allergic history. The best that one can do is to watch for signs of intolerance during medication. These are especially the recurrence or exaggeration of fever, leukopenia and cutaneous manifestations. In the presence of these symptoms it is best to discontinue the drug for a time. If it appears the drug is still needed, one of the other preparations should be tried. Sulfadiazine will probably be less likely to cause allergic symptoms. Sulfathiazole which at present appears to be the most generally useful of these drugs, unfortunately produces the highest incidence of sensitization and there is evidence suggesting that it is more likely to cause polyvalent sensitization than the others.

There is no evidence at present that other drugs given with the sulfonamides predispose to sensitization to the latter. In other words there is no contraindication to the use of other drugs as far as allergy is concerned.

The sulfonamides are such valuable drugs that they should not be used except when their need is clearly and urgently indicated, because they are always administered with the possibility of consequent sensitization which may prohibit their subsequent use. Don't use these drugs for ordinary head colds, tonsillitis, and other illnesses which can be treated equally well by other measures. Save them for the real emergency.

This is true even within the field of allergy. We have no hesitancy in giving sulfonamides in the treatment of status asthmaticus, where it is often a question of life and death, and especially when status asthmaticus is accompanied by fever or the sputum shows coccic infection but we would not use these drugs in the treatment of recurrent severe asthma even in the presence of bronchial tree infection but without status asthmaticus. Such a procedure would entail frequent and repeated use and would probably ultimately lead to sensitization.

WHAT IS THE COMPARATIVE ACUTE TOXICITY OF THE VARIOUS SULFONAMIDES AND THEIR SALTS?

DR. HAAG: It is not always possible to correlate definitely the toxicities of the various sulfonamides as noted clinically, with the findings of the pharmacological laboratory. For instance, when free

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sulfapyridine is given by mouth to mice it is, at least on occasion, very much less acutely toxic than sulfanilamide similarly administered, this being due to faulty absorption of the sulfapyridine. Taking the findings in the literature by and large however, and with due consideration being given the several factors involved, it appears that of the four sulfonamides, namely, sulfanilamide, sulfathiazole, sulfapyridine, and sulfadiazine, sulfanilamide is the least toxic and sulfapyridine the most toxic, the other two coming between, with sulfadiazine probably being less toxic than sulfathiazole. These figures are based largely on lethal dose estimations. It is well to point out, however, that tendencies to produce untoward side reactions on prolonged administration do not always correlate with the relative acute toxicities of the several compounds. For instance, experimentally sulfanilamide is much more prone to produce anemia than either sulfathiazole or sulfapyridine; on the other hand, these latter two compounds have a tendency to produce kidney stones.

The studies thus far reported indicate that by oral administration the sodium salts of sulfapyridine and sulfathiazole are much more toxic than the free acids. The same probably holds for sulfadiazine. This is due to the prompt absorption of the salts from the gastrointestinal tract. By vein one would not expect much difference in toxicity.

Sulfaguanidine and sulfasuxidine both have a low oral toxicity; much lower than any of the compounds mentioned above. In the case of sulfaguanidine this is due, not so much to poor absorption from the gastrointestinal tract, but to very prompt elimination by way of the kidneys after absorption. With sulfasuxidine the low toxicity is due to poor absorption.

In regards to tissue damage on local application of these drugs, the consensus of opinion seems to be that generally there is little to fear. The sodium salts are irritating to the subcutaneous tissue due to their alkalinity. They might likewise be irritating to mucous membranes if used in too high a concentration or for too long a period of time. Recently it has been shown that sulfathiazole is definitely irritating to nervous tissue and that sulfanilamide may damage fatty tissues on local application.

Of more than passing interest are experiments that have recently been published showing that diets high in protein tend to protect laboratory animals against damage by some of the sulfonamides.

WHAT ARE THE INDICATIONS AND CONTRAINDICATIONS OF THE SULFONAMIDES IN OPHTHALMOLOGY?

DR. THOMASON: Locally the sulfonamides have been of value (1) in the treatment of lacerated wounds of lids; (2) Streptococcic conjunctivitis; (3) Pneumococcic conjunctivitis; (4) Corneal ulcers of pneumococcic origin and (5) infections of the lids.

For pneumococcic and staphylococcic infections of the conjunctiva and the cornea, powdered sulfathiazole probably gives the best results. It causes some pain, therefore the eye should be anesthetized previous to dusting the powder into the eye.

A 5 per cent sulfathiazole ointment is recommended in the treatment of perifolliculitis, blepharitis squamosa and blepharitis ulcerosa.

In gonococcic conjunctivitis, the use of sulfapyridine was found to give the best results, but since this drug is not as well tolerated as sulfathiazole the latter is the drug of choice. The drug must be given internally in rather large doses and is continued until three negative smears are obtained, unless toxic symptoms appear.

Thygerson reports that sulfanilamide by mouth along with 5 per cent sulfathiazole ointment locally is quite effective in the treatment of inclusion conjunctivitis.

In intraocular infections sulfathiazole is contraindicated due to its low concentration in the eye, and sulfanilamide is the drug of choice.

WHAT VALUE IS SULFONAMIDE THERAPY IN THE TREATMENT OF SINUSITIS?

DR. GATEWOOD: It is understood that the particular sulfonamide drug used must conform to the sinus bacteriology.

Acute fulminating sinusitis is often helped by internal administration of sulfonamides. If the disease is an acute flare-up of an old process the results are poor.

When complications of severe sinusitis are impending, such as meningitis, septicemia, osteomyelitis

or brain abscess, large doses of sulfonamides internally are extremely helpful.

Uncomplicated chronic sinusitis is rarely benefited by the internal use of the drugs. Considerable use has been made of suspension injections (20 per cent) into the sinus cavity with definite improvement. Insufflation of the powders daily for a while after a window resection of the naso-antral wall is practiced with good results, when the pathology is not too grossly involved.

Local use (Prostz method) of saturated solution of sulfanilamide for ethmoiditis, especially in children, is favored by many rhinologist.

The use of 5 per cent sodium sulfathiazole spray has proved to be more harmful than helpful, because of its strong alkaline (ph 11) effect upon the ciliated epithelium. The normal nasal secretions have a ph of 6.5.

On the whole sulfonamides are much more effective in curing lesions during the period of invasion, than they are in relieving established lesions.

OF WHAT VALUE ARE THE SULFONAMIDES IN TYPHOID FEVER, MALARIA, MALTA, TYPHUS AND ROCKY MOUNTAIN SPOTTED FEVERS? IS THERE ANY CHARACTERISTIC PULSE OR TEMPERATURE IN THE SO-CALLED DRUG FEVER?

DR. WALKER: The sulfonamides are of no value in the treatment of typhoid fever; in fact when given empirically, before the diagnosis is made, much harm may be done in that they not infrequently cause an elevation in the white blood count and produce gastro-intestinal tract symptoms, both of which tend to mask the usual clinical picture and for that reason not infrequently cause the true nature of the disease to be overlooked during the early stage.

The drug is useless as a therapeutic agent in malaria, Rocky Mountain spotted and typhus fevers. In Malta fever, sulfanilamide at one time was thought to be distinctly beneficial. More recent reports have cast much doubt as to its usefulness. At present sulfapyridine is thought to be of more value. This drug, however, is not specific and most clinicians recommend that if it is to be used, it be given in conjunction with immune serum.

The most important clinical feature of so-called drug fever is the fact that the patient does not look as ill as the chart would indicate. The pulse, as a rule, is slow in proportion to the fever.

WHAT ARE THE USES OF THE SULFONAMIDES IN THE TREATMENT OF BURNS?

DR. EVANS: The sulfonamides have been used extensively in burns in the past year. The principal methods for the local use of sulfonamides are:

(1) Sulfadiazine spray (Pickrell). By this method sulfadiazine is dissolved in a tri-ethanol amine solution and sprayed on the burn surface until an eschar is formed. Recently methyl cellulose has been added to this preparation in an attempt to get a better protective coat. Very excellent results have been obtained with this preparation by Pickrell and others.

(2) At the Medical College of Virginia we have had rather extensive experience with 6% sulfanilamide ointment in a fatty base, having treated 79 cases of hospitalized burns with only one fatality. In our hands this has proved the method of choice in the treatment of burns. Its advantages are the simplicity of treatment, few personnel needed, low cost, and its ready adaptability to the treatment of mass burns as will be seen in military surgical practice. Plasma loss is no greater with this method than when an eschar is obtained by the use of tannic acid. Contractures are not seen if early physiotherapy is given; serious infection has not been encountered in this series and scar formation is minimal.

Other workers are using sulfathiazole or sulfanilamide-sulfathiazole mixtures, usually in the 10% concentration and usually in a water dispersible base. Care must be taken when these preparations are used on a large burn surface because of the ready absorption of the sulfonamides from a water dispersible base.

(3) Sulfanilamide powder has been used on burn surfaces. This practice has been discontinued because of the toxic levels of sulfanilamide obtained in the blood stream due to its ready absorption from the burn surface.

Many persons treating burns have given sulfanilamide or sulfathiazole by mouth for the first week or so after the burn patient is received. This is the practice of the armed forces. If sulfanilamide ointments are used locally it is likely that sulfanilamides need not be given by mouth.

WHAT ARE THE LOCAL USES OF THE SULFONAMIDES IN ORTHOPEDICS?

DR. TUCKER: The local use of the Sulfonamide

drugs was started at the Crippled Children's Hospital the latter part of 1938 with little knowledge of its local action and the tissue absorptive powers. Where large sequestra were removed, as much as 6 ounces was inserted and packed about the cavity. Never did we experience more than 3 mgr. per 100 cc. of blood concentration.

Of course, we were groping much in the dark at this time and have found that less amounts instilled into the wounds serve with equal effect. The crystal of Sulfanilamide is used with the greatest efficacy. All open wounds where the drug is used, should be closed effectively enough to prevent serum loss, either by tissue closure or by packing with vaseline gauze.

The Sulfonamides have no particular antiseptic reaction on the bacteria but are unlike the antiseptics in that they do no tissue damage, either to the cells or to the serum. The bacteriophage destroyed by antiseptics is not harmed by the local use of the Sulfa drugs. It is thought that it increases the quantity and potency of the bacteriophage present. The action of the drug is maximum when the concentration of the drug is high, therefore, forced systemic intake as well as local use, work together for the best end. Also, the amount of devitalizing tissue should be small, prompting thorough debridement of all open wounds. Likewise, the drug action is maximal when the bacteria is small, indicating early use of the drug when infection is suspicioned or when it is actually present.

All acute infections, particularly acute osteos, are treated non-surgically as far as practicable. Use Sulfanilamide where streptococcus is evident—Sulfathiazole where staphylococcus is the predominating bacteria in blood concentration as high as 15 mgr. per 100 cc.

WHAT ARE THE USES OF THE SULFONAMIDES IN UPPER RESPIRATORY INFECTIONS IN CHILDREN?

DR. ANDERSON: The determining factors which help in deciding whether or not to use one of the sulfonamides in an upper respiratory infection in a child are best considered first. It is then fairly simple to judge specific cases by the rules laid down and choose the treatment accordingly.

These factors are; first, the intensity and progress of the infection when first seen; second, the probable etiological agent, whether virus or pyogenic bacterium; third, the location of the infection and arising out of this its potential seriousness either early or late; fourth, the natural course of the disease uninfluenced by a sulfonamide.

For example, judged by these rules a tonsillitis of three days' duration of only moderate severity in a reasonably vigorous child might well be allowed to run its course which will probably end in another day or two. If, however, there is considerable toxemia, the cervical glands are becoming tender and the process extending, the sulfa drug may well be used.

A laryngitis accompanied by a fair elevation of fever had best not be watched very long. The dreaded and highly fatal streptococcus laryngitis with or without tracheal and bronchial involvement is too serious a condition to gamble with.

Otitis media is potentially a serious condition although in the large majority of cases it is not. It is not likely to become rapidly and suddenly alarming as is laryngitis. Here we may be justified in watching the trend a few hours but if it is not definitely toward improvement within twenty-four hours the feeling among most pediatricians is that a sulfonamide should be given.

Always use an adequate dose in the beginning and once improvement starts reduce the dose gradually.

WHAT ARE THE EARLIEST SIGNS OF KIDNEY DAMAGE DUE TO THE SULFONAMIDES?

DR. POLE: Of the commonly used sulfonamides, sulfapyridine, sulfathiazole, and sulfadiazine are the ones most likely to cause kidney damage. Sulfanilamide rarely causes renal pathology. The appearance in the urine of crystals of the acetylated forms of the sulfonamides is always a sign of potential kidney damage. The appearance of microscopic or gross hematuria is nearly always an indication for immediate discontinuance of the drug. Abdominal cramps or even typical renal colic often occur as a result of partial obstruction of the upper urinary tract by sulfonamide crystals. Oliguria or anuria are signs of upper urinary tract obstruction and require emergency measures.

Detection of kidney damage can be made early in most cases by frequent microscopic examinations of the urine for blood and crystals and by accurately recording the patient's fluid intake and output.

WHAT ARE THE USES OF THE SULFONAMIDE DRUGS IN NERVOUS SYSTEM INFECTIONS?

DR. MASTERS: Of the sulfanilamide group, prontosil was first used in this country in the treatment of nervous diseases. This was administered by Dr. Ashley Weech in the Baby's Hospital, New York City, July 1935, in a child suffering from a meningeal infection. Since then the many derivatives have been tried out in various infections of the nervous system. Up to date meningitis due to the meningicoccus, pneumococcus, staphylococcus, influenza bacillus, bacillus coli acidi lactici, and bacillus coli communis have been susceptible to one or more of the derivatives. The sulfa drugs have not proven of value in any of the virus disorders but probably have some influence in encephalitis of the von Economo type where the virus is believed to be the symbiotic companion of the streptococcus. I personally observed a boy at the New York Neurological Institute who had polioencephalitis involving the cerebellum and right anterior tibial group, who was treated with sulfanilimide; his infection disappeared after a few days, leaving him with partial paralysis.

The drugs most commonly used are sulfanilamide, sulfapyridine, sulfathiazole, and sulfadiazine. In his study of the results of treatment of pneumococcal pneumonia with sulfonamides, Dowling discovered that sulfadiazine was the least toxic, sulfathiazole the next less toxic, with sulfapyridine giving the highest percentage of toxicity in a group of 644 patients; also that the mortality was lower with the use of sulfadiazine. There was only 3% variation compared with the other drugs.

In the choice of drugs in the treatment of the meningitides therefore it is well to select the least toxic drug and at the same time the one which has the greatest penetration into the cerebrospinal fluid. Sulfapyridine, sulfanilamide, and sulfadiazine are said to be absorbed well.

The sodium salt of sulfapyridine and sulfadiazine may be given intravenously at the rate of 1/10 gram per kilogram of body weight (6 to 9 grams for the initial dose). A 5% solution may be used for the initial dose in distilled water, or a 2% solution in physiologic sodium chloride solution. When given by mouth the average daily dose should range around 4 grams of sulfapyridine or 6 grams of sulfadiazine given in divided doses at intervals of six or eight hours. Increase or decrease in the amount given will depend entirely upon the spinal fluid level estimated daily, and which should be kept at 4 mgm.% or more. Sodium sulfapyridine may be used intraspinally in a 2% solution in doses of 10 to 15 cc. following spinal drainage. The use of antimeningococcic or antipneumococcic serums, etc., are advocated by some. They are certainly to be considered in the fulminating cases where the sulfa therapy seems not to have the desired effect in the first forty-eight hours. Intravenous doses of antipneumococcic serum from 100,000 to 200,000 units as an initial injection are used, and daily doses of 10,000 to 20,000 units given intraspinally in cases of pneumococcic septicemia. From 50 to 100 cc. of antimeningococcic serum may be given intravenously depending upon the severity of the illness; proportionate amounts may be given daily by the intraspinal route. In cases of pneumococcic meningitis accompanying middle ear, mastoid, and sinus disease surgical intervention may be necessary. It is usually best that the patient have at least twenty-four hours of adequate chemotherapy or serum treatment before such procedure is undertaken.

When should change in chemotherapy take place? If the blood and fluid level standard for the particular preparation can not be maintained then change should be made or when evidence of marked toxic reaction takes place. The sulfa drugs should be continued until complete clinical and bacteriological recovery is reached unless toxic symptoms interfere. Chemotherapy in meningococcic meningitis takes from 2 to 5 days; pneumococcic meningitis 7 to 14 days; staphylococcic meningitis 2 to 3 weeks; streptococcic meningitis 7 to 14 days; and in other forms from 1 to 3 weeks to bring about bacterial recovery. If acute hemolytic anemia occurs blood transfusions should be given, and other supportive treatment added.

Very thorough reports on meningitis have been made by Dowling in the December 1941 issue of the Medical Annals of the District of Columbia; by Wm. D. Stubenbord in the December 1941 issue of the Medical Record; and a most exhaustive study of meningococcic meningitis by Dingle and Finland in the January 1942 issue of War Medicine. Little, in the June 6, 1942, issue of the J. A. M. A. reported on the nervous and mental effects of the sulfonamides, all of which I recommend to you for survey.

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WHAT ARE THE MENTAL SYMPTOMS ASSOCIATED WITH SULFONAMIDE THERAPY? PRECAUTIONS?

DR. DARDEN: Since the use of the sulfonamides has become widespread medical literature reveals many instances of psychoses apparently precipitated by one or another of the drugs. The reports are not of the mild states of confusion, delirium, and changed moods of the patients; but they portray those graver mental disorders requiring special attention. Because of the usually rapid recovery from the acute condition, transfer of the patient to a mental hospital is generally unnecessary. Though mental symptoms usually occur during administration, they may appear after withdrawal of the drug.

The psychic manifestations sometimes apparently caused by sulfa-drugs are inconstant, ranging from an uncooperative, negativistic attitude to a condition necessitating complete restraint. Delusions, hallucinations and confusion are prominent symptoms. There is often a persecutory trend with fear tendencies. Even the ambulatory patient may be so profoundly impaired in judgment as to jeopardize his own life and the safety of others. The varying state of the mental content leads to the tentative conclusion that the picture is not characteristic of the causative agent but rather dependent upon the patient's personality make-up.

The fundamental factors liberating the psychic symptoms are not yet understood. The mental disturbance is not dependent upon the blood concentration of the drug. It is interesting to note that in some instances the psychic disturbance has followed withdrawal of the drug in a manner similar to a toxic, mental reaction consequent upon the sudden withdrawal of morphine. But such speculation offers no explanation of the brief and sometimes violent psychoses. The age of the patient and the nature of the disease under treatment afford little help. Mental disturbances have been observed in both the young and in the old patient; and in such widely varying diseases as upper respiratory infections, pneumonia, and gonorrhea. The previous mental health of the patient does not seem to be consequential. In spite of a pre-existing mental disease, we do not hesitate to give the drug when it is indicated, and in such non-sensitive patients there is no aggravation of the previous mental condition. The total dosage and the length of time over which the drug is administered likewise seem to make little difference. Repeated single doses have been known to precipitate a mental disorder following each dose. In others the total amount administered has varied widely, as has the time over which the drug was given. The mental upset occurs altogether independent of other complications.

Sulfanilamide seems to be the chief offender, although others have been known to cause a mental flare-up. The toxic condition of the patient before the drug is given might have a tendency to confuse the clinical picture and lead to the belief that the mental reaction is due to an infectious-toxemia rather than to a chemical toxin. But the usually rapid recovery after withdrawal of the drug, the occurrence of mental symptoms after alleviation of infectious manifestations, the appearance of mental phenomena in patients suffering from diseases which are not accompanied by mental symptoms, and the recurrence of mental symptoms following repeated use of the drug in the same patient would seem to indicate that the manifest mental upset is due to some as yet unknown effect of the drug or to a particular sensitivity of some individuals.

From the evidence at hand, therefore, it seems probable that the use of sulfa drugs may sometimes be the cause of a mental disturbance, demanding the discontinuation of the drug.

An important feature of this type of complication is the danger that impaired judgment of some ambulatory patients may lead to serious entanglements involving others as well as themselves. Such catastrophies should be watched for and guarded against.

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BASIS FOR PHYSICAL THERAPY IN ACUTE POLIOMYELITIS

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The treatment of acute paralytic poliomyelitis has undergone and is still undergoing some extremely interesting and profound changes. To those of us who have had the opportunity of treating acute polio by the traditional methods in the past and who are now utilizing the newer methods, these changes have been dramatic and inspiring. We feel we are watching and perhaps contributing in some part to the evolution of forms of therapy which as never before will give the patient the best possible chance of functional return of muscle power.

We know well that the answer to the problem of prevention and cure of poliomyelitis is still beyond our grasp. No known method of treatment can restore the patient's power of voluntary contraction and relaxation of a muscle after there has been profound loss of anatomic continuity of the motor nerves between the spinal cord and that muscle. However, this does not detract from but rather enhances the value of continued search for means by which all remaining muscle and nerve tissue can be salvaged and utilized with utmost efficiency.

Our renewed interest in the treatment of early poliomyelitis has been brought about in great part by the brilliant observations and persistent efforts of Miss Elizabeth Kenny of Australia. To thoroughly appreciate Miss Kenny's contribution we must realize that she has not only given us a better method of treating poliomyelitis, but, more important, she has brought to us an entirely new conception of the acute phase of the disease.*

Most of us have had difficulty in accepting her method simply because we did not understand that Miss Kenny's contribution wasn't simply a better treatment of poliomyelitis but rather it was an entirely new addition to our knowledge. Fortunately, her ideas are additions to our knowledge and not contradictions or denials of proven pathological facts, but they do demand a treatment during the acute phase of poliomyelitis which conflicts with our traditional forms.

We now see and appreciate the profound effects of muscle spasm in acute poliomyelitis. We realize that loss of voluntary muscle power does not necessarily mean the destruction of vast numbers of motor nerve cells but in a great number of cases is the manifestation of a physiological or psychological blockage and distortion of the flow of nervous impulses from the brain to the muscles. Miss Kenny[1] coined the term "mental alienation" to describe such a blockage.

We now realize more fully than ever before that the delicate balance of muscle power necessary for skilled movements can be severely upset following invasion of the central nervous system by the virus, and new co-ordination patterns must be built up by intelligent muscle re-education, tediously and meticulously carried out over long periods of time.

Realizing these facts, our treatment is designed to release muscle spasm, restore the patient's appreciation of joint movement and muscle action, and re-establish smooth, co-ordinate balance of muscle power.

We arrive at these general principles of treatment very easily and without dispute, but to set up a practical and thoroughly efficient routine of treatment we must have for its basis proven physiological and pathological facts. We can never hope to treat paralytic poliomyelitis with absolute assurance that nothing more can be done until we know all of the details of the underlying pathology and deranged physiology.

Let us not be too quick to believe we have discovered a magical formula until all the facts are known. We do not know all the facts at the present time. Almost all patients now admitted to the Warm Springs Foundation give the history of having had the "Kenny method", given by their family physician or perhaps an osteopath, chiropractor or simply a knowing friend. On further interrogation, it is found that in most cases they have had nothing more than unrestricted activity and the application of hot towels a few times a day. This, of course, is

*We are beginning to realize that we should include in the acute stage of the disease that entire phase beginning with manifestations of irritation of the central nervous system and ending only when all muscle spasm and pain has subsided. Thus, the acute phase of the disease may last from several days to several months.

far from being adequate treatment. It is certainly not the treatment advocated by Miss Kenny and cannot lead to anything but disaster in the case with real involvement.

Let us first consider muscle spasm. Clinically, it is manifest by hyper-tonicity, a hyper-irritability, and involuntary and uncontrolled shortening of the involved muscle. This muscle is tender on pressure and painful when moved. Wright[2] has shown us that this muscle is under increased pressure within its sheath. When the sheath is exposed and cut longitudinally the muscle fibers bulge out of the divided sheath with greater force than that of normal muscles. It is observed that these exposed fibers of muscle are bathed in a sticky fibrinous fluid quite unlike that of the clear serous moisture usually surrounding normal muscle fibers. After the sheath is retracted, fibrous cobwebs are noticed between the muscle fibers and between the muscle and its sheath. This would appear to be evidence of an inflammatory or toxic lesion within the muscle itself. No microscopic studies of muscle biopsies have as yet been reported during this stage of the diesase. As Wright further points out, it is wholly logical to believe that if muscle spasm is not released early, a gradual organization of this inflammatory exudate takes place. This sticky exudate will become tough and fibrous, and the end results will be a shortened, non-elastic, fibrous, useless muscle. When a muscle exhibiting such a contracture is exposed, it is seen that the muscle fibers are pale and yellow, they do not bulge through the divided sheath but remain inert, matted down by this organized exudate. These findings indicate that we must be on the alert to recognize early evidences of spasm throughout the entire muscular system and immediately institute measures capable of aiding the absorption of the inflammatory products.

Relief of muscle spasm may best be brought about by an efficient form of heat applied to the involved region, by careful positioning of the patient and by any measure designed to relieve pain. There are many excellent forms of heat application. Toomey[3] advises the use of cradles lined with infra red bulbs. I am sure all of us have used many modifications of this heat source. However, in my opinion, hot fomentations made up by heating 100 per cent woolen blanketing in boiling water and wrung between very tight wringers before application to the involved region, is the most efficient and practical method known at the present time. One hundred per cent wool has the property of holding heat even though wrung almost completely free of moisture. Thus, the desired intensity of heat can be applied without the danger of burning the patient. These fomentations appear to be of more value than a constant source of heat because they give the circulatory response or contrasts of intense heat followed by rapid cooling. It is not enough to apply one or two hot packs a day. Our problem is to release muscle spasm as quickly as possible and this can only be done by repeated packing—day and night, if necessary.

The position of the patient should be as natural as possible. We feel that a recumbent position which simulates the normal standing posture is more nearly correct than the formerly advised "neutral position". It is felt that by keeping the patient in this "natural" position, normal postural reflexes are encouraged and the muscles and joints are in accustomed and physiological positions.

Careful movements after the pain and spasm have subsided will minimize the formation of limiting bands of scar tissue. Certainly prolonged rest and rigid splinting are absolutely contraindicated. Clinical and pathological findings demand that we make a transition from such rigid immobilization to intelligent physical therapy applied immediately after the diagnosis is made. This must be done if we are to limit the effects of the disease to those neuromuscular units destroyed by primary action of the virus.

Deformities that we formerly considered due to the pull or a normal muscle against a paralyzed one are now considered to be caused by the unrelenting pull of the involved muscle against one primarily uninvolved. The normal muscle is kept in a state of partial or complete flaccidity by a reflex relaxation caused by the reciprocal innervation existing between opposing groups of muscles. The normal muscle is thus stretched beyond its normal length and its pull is rendered inefficient by the breaking action of the contracted muscle. Even though the cause of spasm is not known, the early and late effects of unreleased spasm are so disastrous that we must use all the proven means at our disposal to release it as quickly and as completely as possible.

Changes in the central nervous system could conceivably cause muscle spasm. Physiologists have

long shown us that in the regions of the anterior horns of the spinal cord attacked by the virus of poliomyelitis, we see in addition to motor cells completely destroyed, other apparently normal neurons surrounded by distended tissue spaces, perivascular infiltration, and other evidences of local inflammation. It is possible that these cells could be kept in a state of irritation resulting in spasm of the muscles innervated by these neurons.

Kabat[4] has shown that spinal cord anoxia produces muscle spasm with a distribution very similar to that found in early poliomyelitis. There is no doubt that local muscle and connective tissue anoxia due to impaired circulation must play an important part in the effect, and perhaps cause, of muscle spasm. The potassium-ion concentration and hyper-sensitivity of denervated muscle to acetyl choline must also be considered and studied.

Our next problem is the early restoration of the patient's appreciation of joint movement and muscle action. It is quite clear that this cannot be effectively accomplished until the muscles can be lengthened normally without pain. This cannot be done until the joints can be moved in their full range of normal motion. When muscle spasm has been released and no limitation of joint range is present, the patient is very carefully taught the position and action of prime muscle groups. The joint is passively taken through a normal range of motion. The patient is made aware of the joint movement. He feels the tension of the periarticular tissue and he is taught to feel the movement in the joint produced by the pull of specific muscles or groups of muscles. All this is done because we believe that an apparent loss of voluntary muscle power can result from a subconscious distortion or blockage of impulses in the normal pathways connecting the cortex and the anterior horn cells. The patient is unable to effectively send impulses from his brain to the desired muscle even though the neuro-muscular unit is intact. He has, in a way, forgotten over which pathway to send these impulses. These impulses may be entirely ineffective or may bring about contraction in widely divergent or even opposing groups of muscles. This is the result of the so-called "mental alienation", about which we so frequently speak. "Mental alienation" is not a new medical entity. An example of this so-called "mental alienation" is frequently seen in children with acute joint lesions who cannot voluntarily contract muscles motivating that joint, presumably because of a subconscious blocking due to pain and inability to release reflex protective spasm. We frequently see this loss of voluntary contraction in certain muscle groups following surgical procedures to or about joints. For example, it may take qiute a period of treatment before the patient can voluntarily contract the quadriceps again after a knee operation. In poliomyelitis mental alienation is thought to be due to such factors as muscle pain, spasm, a disuse. Knapp[5] states that undoubtedly this condition includes the temporary paralysis produced by more destructive damage to the nerve cells which later recover spontaneously after the infection subsides.

Our third problem is to restore a smooth balance of muscle power, to again bring about coordinated movement. This cannot be done by allowing a patient to move any muscle he can, but rather it must be done by very tedious and painstaking reeducation of individual groups of muscles considered to be of greatest value in obtaining certain important motions. The patient must be able to bring about a smooth, sustained contraction in these muscles, accompanied by complete relaxation of all other muscle groups not entering into this particular action. No attempt is made to increase the strength of any group of muscles beyond a point where opposing muscles have a balance of power. All our early effort is directed at training our patients to use the right muscle at the right time without the distracting pull of muscles which, though under ready control, are not anatomically placed to produce smooth functional motion. It is with unceasing amazement that I see patients with very little muscle power carry out effective functional activity without the limping and lurching formerly seen. This has been brought about by a method of re-education which gives the patient an appreciation of the correct planes of motion and builds up a balance of muscle power that enables him to carry out smooth motion in those planes.

We admit again that no method yet devised can cure poliomyelitis, but we do say that early treatment, so sketchily outlined above, meticulously and carefully done, will give the patient the greatest amount of functional rehabilitation possible through utilization of his undamaged nerve cells. Even if this treatment offered no statistical advantage over our tradition forms it would still be the method of choice because the patient is far more comfortable

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during treatment, the skin and subcutaneous tissue are kept in excellent tone, circulation is improved, joints are kept mobile, muscular contractures are averted and structural deviations and torsions are completely avoided. However, we all feel that we are only scratching the surface of treatment. Our research men—our physiologists and pathologists—must, and eventually will, give us the basis for these newer clinical manifestations. When all these basic factors are thoroughly understood, intelligent treatment will follow as a very natural sequence. Scientific medicine should always take this orderly course. No one of us working alone can expect to develop the flawless treatment. We must profit from the findings of trusted investigators and evaluate these findings in the light of our own experiences.

Consider the evolution of the method brought to us by Miss Kenny. How much more logical and scientific is her method today than it was just five years ago as evidenced by her book published in 1937. The brilliant success of her method of treatment in Minneapolis today must in no small part be credited to the able support of the medical profession working with her. To Miss Kenny, for her keen perception and devotion to the cause of treatment of poliomyelitis, medicine owes a debt that can only be repaid by an equally keen and devoted research designed to support, or, if necessary, to intelligently alter that which she and other serious investigators have given us. To disagree on certain details of technic is a healthy attitude and a spur to continue research, but our therapy must be based on sound, proven physiological and pathological effects as well as brilliant results before we have the right to say that this is the only treatment and that all others are wrong.

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SOME ASPECTS OF CANCER OF THE STOMACH*

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The control of cancer is one of the important problems of the world. At present, of course, the war dominates everything else, but even in warfare the control of cancer is important. Cancer has increased greatly. For the last few years the deaths from cancer in the United States have been about 150,000 each year. Thirty years ago the deaths were about half of this. Eusterman of the Mayo Clinic estimates that about one-third of deaths from cancer are from cancer of the stomach.

Cancer of the stomach is responsible for more deaths than cancer of any other one organ. Cancer of many other portions of the body, as the skin, is far more frequent than cancer of the stomach, but it is more readily observed and cured, so that it does not reach the mortality rate. It is often erroneously stated that cancer of the stomach is the most common cancer of the body. It is the most deadly, but not the most common.

The control of cancer, and particularly of the deadly type of gastric cancer, is not only a humanitarian but a military problem. If there are more than 150,000 deaths from cancer every year in the United States, it is estimated that there are probably three living cases of cancer for every cancer death, and this would make a total of about one-half million persons suffering from cancer in this country at one time. Many of them require at least one attendant, and some of the patients who can afford it have two or more attendants, often trained nurses whose services are so greatly needed in the war effort. If we assume, then, that there is an average of one attendant for each cancer case, giving either whole or part-time attention, it will make the figure about one million persons who are more or less absorbed by cancer. The reduction of the incidence

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of cancer and the cancer death rate would naturally release many of these individuals for military service, quite aside from the saving of life and the reduction of suffering.

There is only one effective treatment for cancer of the stomach and that is excision by surgical operation. Occasionally, a rare case of small round cell carcinoma or lymphosarcoma of the stomach is radio-sensitive, but even in such instances it would be best to operate and then use irradiation. The ordinary variety of cancer of the stomach can be successfully treated only by surgical excision.

The points to discuss, then, are those common to other malignant diseases, an early diagnosis, because it is well known that in cancer elsewhere an early diagnosis and prompt treatment are the best methods to effect a cure. There are, of course, occasional instances in which even early cancer of the stomach is so malignant that prompt operation does not cure, but again these are exceptional cases and we must go by the rule of what usually happens if we wish to improve the results.

PEPTIC ULCER AND CANCER

There has been much discussion as to the causal relationship between peptic ulcer of the stomach and gastric cancer. Ulcer of the duodenum rarely results in malignancy, so rarely that it can be almost disregarded, but peptic ulcer of the stomach not infrequently leads to cancer. Whether the lesion, even in the early stage, is primarily a malignant ulcer or whether it is a benign ulcer that is turning into cancer is more or less an academic question. The clinical importance is that the lesion should be recognized as malignant and extirpated as soon as possible.

Rivers and Dry, of the Medical Department of the Mayo Clinic (Rivers, A. B., and Dry., T. J.: Differentiation of Benign and Malignant Gastric Ulcers. *Arch. Surg.*, 30:702, 1935) say: "It seems to us that unless contra-indications are present it is usually safer to treat gastric ulcers surgically." A noted medical gastro-enterologist, Dr. William Gerry Morgan (Morgan, W. G.: The End Results of Treatment for Peptic Ulcer. *Sou. M. J.*, 25:256, 1932) believes that all cases of gastric peptic ulcer are surgical cases for immediate operation. This doubtless is the safest attitude in the long run, but if the ulcer is small it would seem justifiable to give medical treatment for a few weeks.

Friedell (Friedell, M. T.: Prolonged History of Carcinoma of the Stomach in Persons in the Third Decade of Life. *Proc. of Staff Meetings of Mayo Clinic*, 14:529-535, Aug. 23, 1939) quotes instances of prolonged history of carcinoma of the stomach in the third decade of life and gives a report of fourteen patients who had cancer in the third decade of life. Of these the average duration of symptoms was 3.3 years. In eight of these cases there were symptoms of an ulcer type, in three there were nausea and retention vomiting, and in three others there was a non-specific type. Comfort, of the Medical Department of the Mayo Clinic, in discussing these cases, states: "Favorable cases (of peptic ulcer of the stomach) may be selected for medical treatment but in all fairness to the patient surgical exploration constitutes the treatment of choice whenever the lesion does not heal promptly and doubt persists regarding the nature of a lesion. In many instances the pathologist must be the final judge of the nature of the lesion."

RELIEF OF SYMPTOMS

One of the most fatal impressions concerning cancer of the stomach is that if medical treatment is given and the patient is relieved of his symptoms, it is, therefore, a therapeutic test that the disease is not malignant, just as giving quinine for an indefinite fever is supposed to be a therapeutic test for malaria. *As a matter of fact, most early cases of cancer of the stomach are relieved of the symptoms for a while by medical treatment as given for peptic ulcer.* The fallacy of the belief that diet is a therapeutic test for gastric cancer has been the cause of many deaths and prolongation of the advance of the disease that otherwise would not occur.

FRIENDSHIP

One unfortunate obstacle to the early diagnosis and treatment of cancer of the stomach is friendship. So many individuals with a great dread of cancer of the stomach appeal to the sympathies of friends and physicians for a different diagnosis or a delayed diagnosis that the treatment often follows the well-known lines of military failure—"too little and too late". Thus, Thomas Scholz, of New York (Scholz, Thomas: Curriculum Vitae of Two Gastric Cancers. *Am. Jour. of Cancer*, 18:834-851, August, 1933) reports two cases which he diagnosed roentgenologically as cancer of the stomach, one 2½ years and the other 3½ years before they came to an opera-

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tion. At operation the lesion was too extensive for resection, but the patients were apparently in good health when the diagnosis was first made. Because of the apparent good health and well-being it was difficult for the patient and for the attending physician to accept the diagnosis at a time when the lesion was operable. Dr. Scholz says: "The practitioner must, therefore, realize that x-ray examination furnishes him a means of obtaining a diagnosis in practically every instance at a sufficiently early stage to make recovery possible by a timely operation. But to save the patient's life he must order the x-ray examination *early* and not late in the disease. It is still a common experience; in fact, it seems to be the rule that patients are treated for digestive disturbances for months and even years without previous roentgen examinations, and that the latter are ordered only after clinical evidence of gastric malignancy has appeared, just for confirmation. Not infrequently great pride is felt in such a confirmation. It apparently is not yet fully grasped that such an attitude is nothing to be proud of. On the contrary, it should be recognized that such a delay in the use of roentgenology is the worst service the physician can possibly render his patient, because thereby he robs him of the only chance of recovery, as a late x-ray examination is quite as useless as a late clinical diagnosis."

SYMPTOMS AND DIAGNOSIS

First of all, we must dismiss the ancient textbook description of cancer of the stomach with frequent vomiting, palpable mass in the abdomen, sallowness of the skin, and enlarged lymph nodes in the neck. Such cases are usually hopeless. It would be as reasonable to put off the diagnosis of a ruptured appendix until general peritonitis is obvious as to delay the diagnosis of gastric cancer to such a stage. To be sure, there are a few instances in which cancer of the stomach as a palpable mass in the abdomen can be removed successfully, possibly with a slight hope of cure. These are the types of bulky cancer often with degenerative or colloid changes.

The symptoms of gastric cancer are not always continuous. They may be remittent or intermittent just as in peptic ulcer. Among other fallacies, according to Gaither (Gaither, E. H.: Gastric Carcinoma: A Clinical Research. Preoperative Course and Postoperative Results. *Sou. Med. Jour.*, 28:107, 1935), are the following: "(a) Local gastric symptoms, loss of appetite, cardialgia, eructation, pyrosis, nausea, vomiting, pain, distention, and variable types of discomfort are no worse in beginning carcinoma than in other gastric disease. (b) A latent stage is possible during which time the process advances very slowly, with an utter absence of symptoms. (c) A general marasmus, or a variable anemia, may occur, with the gastric symptoms so wholly in abeyance as to be quite unrecognizable. (d) A beginning carcinoma may progress without definite symptoms; again, it is marked by ulcer symptoms, or symptoms of chronic gastric catarrh."

Cancer of the stomach is more common in men than in women, though in my experience the incidence of cancer of the stomach in women is not so infrequent as it appears to be in other clinics. The majority of cases of cancer of the stomach occur near the pyloric end; consequently, the symptoms of obstruction prevail. This is very fortunate, because it will produce symptoms at an earlier stage than with cancer in other portions of the stomach without obstruction. This obstruction may cause water brash, heartburn, discomfort, and sometimes nausea and vomiting before the lesion is far advanced. Pain is not often present, but may be cramp-like, sharp, or boring. It is usually in the upper epigastric region. When intermittent pain relieved by food becomes continuous, it is supposed to be significant of a benign lesion turning into cancer, but this symptom may be found in a benign ulcer that has slowly perforated posteriorly.

There is a marked difference in symptoms in different patients caused by the same lesion. Libman (Libman, E.: Observations on Individual Sensitiveness to Pain. *J. A. M. A.*, 102:335, 1934) has called attention to this. Thus, in the hyposensitive, either no symptoms may result from a gastric lesion that would cause marked indigestion in the hypersensitive, or there may be substituted symptoms referred, for example, to the chest. In the early stages of gastric carcinoma, the appetite may be quite variable, and the patient may actually gain weight. Nausea and vomiting are common, although often there is no vomiting until later in the disease unless obstruction exists. Lesions along the greater curvature particularly may be unaccompanied by vomiting throughout the course of the disease. The vomiting of blood is infrequent in cancer of the stomach. Probably not more than 5 per cent of cases of gastric cancer actually vomit blood in any considerable amount, whereas in 20 per cent of peptic ulcers

there is distinct hematemesis or melena. Occasionally, however, vomiting of a small amount of coffee-ground-like material occurs, but even this is not as common in gastric cancer as it is supposed to be. A much more common sign is occult blood in the stool, which can be determined by the guaiac or benzidine test after a 3-day meat-free diet, or the string test of Einhorn may show blood. (Horsley, J. Shelton: Cancer of the Stomach. *Southwestern Medicine,* 256-259, August, 1940).

Only about 50 per cent of gastric cancers have decided ulceration. Tarry stools are rather infrequent, but occult blood may be found in many cases in which neither hematemesis nor tarry stools are obvious. Loss of weight is common, but it should not be too much emphasized, since it is usually a late symptom. Anemia is often present, although this, too, may be a late symptom. However, it may arise from a large fungating cancer of a colloid type and low grade of malignancy or from a malignant polyp, and does not necessarily indicate that the disease is inoperable.

THE GASTRIC CONTENTS

Examination of the gastric contents may be suggestive, but it must not be too greatly valued. Most cancers of the stomach, particularly if well advanced, show achlorhydria, or at least a diminished amount of hydrochloric acid in the gastric juice, and this finding along with clinical symptoms suggesting gastric cancer must be given full weight. There are, however, two conditions that must be considered in this connection. The first is that achlorhydria is more common than it was formerly supposed to be, and seems to increase with advancing years. It is difficult to imagine that millions of cells in the stomach whose chief function is to secrete acid can remain entirely functionless indefinitely without some histologic lesion, though in many cases of achlorhydria in patients who die of something else microscopic examination shows but little if any alteration of the gastric structure. Achlorhydria may be a sequence of a low-grade chronic gastritis, which in itself from irritation may favor cancer. Indeed, Hurst believes that gastritis is the precursor of cancer in about 75 per cent of cases (from Comfort, M. W., and Butsch, W. L.: *Proc. Staff Meetings, Mayo Clinic,* 13:151-154, March 9, 1938).

The second condition is that occasionally gastric cancer is found when the hydrochloric acid in the gastric juice is normal.

THE GASTROSCOPE

The gastroscope has come into more favor in recent years, since Schindler's gastroscope has been in use. It is undoubtedly helpful in certain cases, particularly in detecting lesions in the cardiac portion of the stomach where there is difficulty in locating them with x-ray. However, it should not be too greatly depended upon. The mere presence of a small ulcer in the stomach seen through the gastroscope does not necessarily indicate whether it is benign or malignant. Not infrequently the nature of such a lesion cannot be definitely determined until microscopic examination has been made.

ROENTGENOLOGIC EXAMINATION

The most important method of making a diagnosis of malignant lesions of the stomach is by x-rays. Such an examination, however, should be made by one who is skilled in roentgenologic diagnosis of the gastro-intestinal tract. A half-baked roentgenologic diagnosis of lesions of the stomach or colon is worse than none at all. The method of diagnosis by x-ray has reached a high state of efficiency, but it must be recalled that when a filling defect of cancer is observed in the stomach, the lesion is already advanced. Even a punch-like defect supposedly characteristic of a benign ulcer of the stomach has been found occasionally to be caused by cancer. The defect from a cancerous ulcer may appear partly to fill up on subsequent x-ray examination. Then, too, it is possible to have both a benign duodenal ulcer and a cancerous gastric ulcer existing in the same patient. The late Dr. Carmen, chief roentgenologist at the Mayo Clinic, developed an x-ray sign, called "meniscus", which is almost pathognomonic of gastric cancer when properly interpreted. It consists of a defect in the stomach that goes no deeper than the mucosa, but when pressed upon with the stomach partly filled with barium it produces a lens-like appearance of the barium in the base of the defect. This is due to the fact that most cancerous ulcers have an everted and prominent margin, and when pressure is made upon them they tend to close and so shut off the barium in the depths of the ulcerated area. Deeply penetrating lesions are usually benign. The observation of the pattern of the mucosa and the sequence of peristalsis over the lesion is important in picking up an early cancer of the stomach.

It has already been emphasized that peptic ulcer of the stomach is an object of suspicion. The size

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of the lesion has much to do with the diagnosis. Alvarez and MacCarty find that there is one chance in fifteen that any ulcer in the stomach smaller than a dime (1.5 cm. in diameter) and one chance in ten that an ulcer smaller than a quarter (about 2.5 cm. in diameter) is early cancer. If it is larger than a quarter but smaller than a half dollar, the chances in favor of ulcer or cancer are about equal. If it is larger than a half dollar but smaller than a silver dollar, it is almost certainly cancer. (Comfort, W. M.: Discussion of "Prolonged History of Carcinoma of the Stomach in Persons in the Third Decade of Life" by M. T. Friedell. *Proc. of Staff Meetings of Mayo Clinic,* 14:529-535, Aug. 23, 1939).

SUMMARY OF DIAGNOSIS

In order to make an early diagnosis of cancer of the stomach we should be to some extent cancer-minded. We more frequently find what we are actually looking for. Any patient over 35 years of age, and particularly a man who has gastric symptoms, should be treated by a general practitioner for a few weeks, and if the cause of these symptoms can be ascertained and corrected, nothing further need be done. But if the cause of the symptoms cannot be ascertained and corrected, the patient should be given a thorough roentgenologic study. The earlier the diagnosis is made, usually the more difficult it is. If, then, as we can adopt this policy of an early thorough examination as has been outlined, the great majority of these patients will prove to have either a nervous condition or some extra-gastric cause for their symptoms which can be relieved, but every now and then a case of gastric cancer will be picked up that would otherwise be missed. I have seen patients with inoperable cancer of the stomach that have been treated for "nervous indigestion" for many months or years. It is true that there is a small proportion of cases in which the malignancy develops along the "silent" area of the greater curvature or cardiac end, and nothing can be done because there are no symptoms until the disease is too far advanced for treatment, but it is equally true that the great majority of cases of gastric cancer are located either in the pyloric end of the stomach or in the main body of the stomach, readily susceptible to partial gastrectomy.

TREATMENT

As has been mentioned, the only satisfactory treatment for cancer of the stomach is surgical excision. This should always be some form of partial gastrectomy. Merely removing the local lesion is not enough. The fact that this treatment has not been adequately applied is well brought out in a series of necropsies by Dr. Margaret Warwick (Warwick, Margaret: Analysis of One Hundred and Seventy-Six Cases of Carcinoma of the Stomach Submitted to Autopsy. *Ann. Surg.,* 38:216, August, 1928). She has called attention to the fact that in 23 per cent of the necropsies of 176 gastric cancers the cancer was still limited to the stomach, whereas in the total deaths in a larger series of necropsies of gastric cancers of Saltzstein and Sandweiss (Saltzstein, Harry C., and Sandweiss, David J.: The Problem of Cancer of the Stomach. *Arch. Surg.,* pp. 113-127, July, 1930) only 7.7 per cent had undergone a partial gastrectomy. This shows undoubtedly that many cases of cancer are permitted to go to their death that might have been given some chance by a gastrectomy done by one skilled and trained in this work. One of the chief causes of deaths in cancer of the stomach, according to Dr. Warwick, is perforation of the stomach. It has usually been assumed that perforation of the stomach is due to peptic ulcer, but in Dr. Warwick's series of 176 cases there was open ulceration in only about 45 cases, and in about half of these death was due to perforation and peritonitis.

Naturally, preventive treatment has a definite place. Aside from the tendency of some gastric ulcers to become cancerous, or, as has been said, what amounts to the same thing as far as practice is concerned, having a very early cancerous lesion simulate peptic ulcer, a so-called benign polyp in the stomach is very likely to be a pre-cancerous lesion. McRoberts (McRoberts, J. W.: Gastric Polyps. *Proc. of Staff Meetings of Mayo Clinic,* 8:685, 1933) has reported five cases of gastric polyp removed at operation in which histologic examination showed that four contained definite cancerous issue. One case in which three apparently benign polyps were removed by excision with the cautery was reported, and the patient came back 6½ years later with gastric cancer that was inoperable.

Finesilver (Finesilver, Edward M.: Benign Tumors of the Stomach. *Surgery,* Vol. 12, No. 2, 216-235, August, 1942) records nine cases of apparently benign tumors of the stomach in which three had become malignant at the time of operation. Eliason and Wright examined twenty-three cases of polyps

of the stomach and found carcinomatous changes in eight. Benedict and Allen reported seventeen cases of gastric polyp from the records of the Massachusetts General Hospital and found seven in this group, or 41.2%, showed evidence of malignancy. The presence of a so-called benign polyp in the stomach, then, is a very strong indication for its removal. This can very often be done through a gastrotomy opening without necessarily doing a partial gastrectomy. Such a removal, however, should be followed preferably by some form of pyloroplasty or a gastro-enterostomy in order to relieve the pressure in the stomach during healing.

The patient should be well prepared before any operation is undertaken. Intravenous dextrose in Ringer's solution or hypoclysis, and concentrated food with high vitamins, should be given for several days. There should also be gastric lavages to have the stomach cleared out. Dilute hydrochloric acid should be given and the stomach washed out with ½ or ¼ of 1 per cent of dilute hydrochloric acid. This is an excellent physiologic antiseptic. It may be necessary to give a transfusion of blood before operation, but almost always a transfusion should follow operation.

For gastric cancer some form of gastrectomy is indicated. If the lesion is near the pylorus, it can frequently be removed by a type of Billroth I operation in which the stump of the stomach is united to the stump of the duodenum. I have been using a modification of the Billroth I for about 17 years. However, when the cancer is in the body of the stomach and a more extensive operation is indicated, a form of Billroth II should be utilized. In this type the stump of the stomach is united to the jejunum. All gastrectomies, except total gastrectomies, are classified either as a modification of Billroth I when the stump of the stomach is united to the stump of the duodenum, or a modification of Billroth II in which the stump of the stomach is united to the jejunum. This modification of Billroth I permits more nearly a physiologic reconstruction. The stomach contents normally empty into the duodenum. The susceptibility to the irritation from the stomach contents increases from the duodenum down to and including the colon. The reason why peptic ulcers are so frequently found in the duodenum is because it receives the impact of the concentrated gastric juice. If the mucosa of the duodenum were as susceptible to the gastric contents as the middle or lower jejunum or ileum, we probably would all have peptic ulcers.

That the Billroth II type of operation is not without danger, even after cancer, has been shown in a report by Fordyce St. John, of New Jork (St. John, F. B., Whipple, A. O., and Raiford, T. S.: Treatment of Carcinoma of the Stomach; Summary of Results. *Am. J. Surg.*, 3:246, Feb., 1926), of a case in which cancer of the pyloric end of the stomach was removed by a Billroth II type of operation and the patient a few weeks later died of a perforating ulcer of the jejunum. If a Billroth II type is to be utilized, the Hofmeister modification appears to me to be more satisfactory than other modifications. It requires less loop and avoids unnecessary kinking.

Gastro-enterostomy has but little, if any, place in the therapy of gastric cancer. Even when a large fungating mass occupies the pyloric end of the stomach, the modification of Billroth I method, as described, conveys but little more danger and makes the patient more comfortable than a gastro-enterostomy with the sloughing mass left behind.

POSTOPERATIVE CARE

An important feature of the postoperative care is keeping the stomach empty. The use of a Levine or Jutte tube through the nostril is not only uncomfortable, but is by no means free from danger. Iglauer and Molt (Iglauer, S., and Molt, W. F.: Severe Injury to the Larynx Resulting from the Indwelling Duodenal Tube. *Ann. Otol., Rhinol. and Laryngol.*, 48:886, 1939) reported severe injury to the larynx from indwelling duodenal tubes, with ten cases occurring over a two-year period and eight of these developed laryngeal stenosis that required tracheotomy. Two of the patients died. In order to prevent this complication, we use what we call a simple tube gastrostomy. This can be utilized not only after any partial gastrectomy but after gastro-enterostomy or pyloroplasty. After the posterior row of sutures, uniting the stomach to the duodenum or to the jejunum, has been placed, a sharp-pointed hemostat is thrust through the stomach from within outward at a point on its anterior wall near the greater curvature about 3 inches from the stump of the stomach. A soft rubber catheter with additional perforations is drawn through until about 3 or 4 inches of it protrudes into the stomach. It is fastened to the wall of the stomach by a fine suture of chromic catgut. A purse string suture of the same material is

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placed around it. When the union of the stomach and bowel is completed, the butt end of the catheter is drawn through a stab wound to the left of the abdominal wound at a point where the stomach easily approximates the parietal peritoneum. The stomach is fastened to the parietal peritoneum with four sutures of fine chromic catgut and a tag of omentum is drawn around for additional security.

CONCLUSION

Trivial symptoms of indigestion in those over 30 years of age, especially in men, should be considered seriously and not casually, and the cause of these symptoms should be definitely ascertained. The mortality rate from cancer of the stomach is amazing. Comparatively few patients with cancer of the stomach are given a chance for recovery in the reasonably early stages. The only treatment for cancer of the stomach is some type of gastrectomy. An operative technic should be employed which will radically remove the lesion and at the same time restore the gastro-intestinal tract as nearly as possible to its normal.

TREATMENT OF BURNS
With Special Reference to the Use of Sulfadiazine*

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Much evil and little that is good attends a universal calamity such as the present war. Among the few benign influences is the impetus which necessity forces on constructive scientific research, especially in the province of medicine and surgery.

In this particular war, one of the most prevalent and serious of injuries is the burn. We can expect a much more expert approach to the treatment of such traumata than we have heretofore known, something which will benefit the unfortunate victims now as well as the civilian population in future time of peace.

To illustrate the high incidence of burns in this conflict, it is stated[1] that by far the majority of casualties at Pearl Harbor were of this variety, and to show further what is entirely within the realms of possibility, a reliable writer points out the extreme hazards of fire following air raids. He says that one plane can drop 1,000 small thermite bombs, and out of this number 75 will start serious fires. In addition to air raids, many burns result from flaming oil, both from ship sinkings and from bursting fuel containers.

Already the management of traumatic wounds and burns has made vast strides toward ideal handling, and our results in treating burns, often one of the most disappointing and discouraging problems with which the medical profession has to deal, have begun to offer some ray of hope.

The purpose of this paper is to outline and emphasize a rational treatment of burns with particular attention to a relatively new agent which has much to recommend it and little to condemn it. This agent is a special solution of sulfadiazine developed for local use by Dr. Kenneth Pickrell of Johns Hopkins.

Before discussing the local therapy of burns, it might be profitable to consider the general measures now in use from the time the accident occurs until the definitive treatment is well under way.

The first point to decide is the seriousness of the burn. The extent, the degree, and the causative agent are all important factors in making this decision. The amount of body surface burned may be conveniently estimated by Berkow's method. In this the trunk constitutes 38 per cent of the total, the lower extremities the same, the head 6 per cent, and the upper extremities 18 per cent. Children vary somewhat according to age. Any burn involving 20 per cent or more of the body surface, no matter how superficial, is potentially serious. Some authors consider a smaller area as the lower limits of a serious burn.

The degree is often difficult to evaluate. The American system classifies burns into three degrees. First degree burns cause erythema, second degree cause vesication, and third degree cause injury to the entire thickness of skin or to the underlying tissues. It is occasionally helpful to further subdivide third degree burns into those causing injury to skin alone, those damaging muscle, and those injuring bone. Some burns, of course, will have several degrees represented in the various areas covered.

*Read before the Southwestern Virginia Medical Society, at Wytheville, April 23, 1942.

Any third degree burn is serious, and second degree burns involving 15 per cent or more of the body surface are major burns. Some people are more sensitive to these injuries than others, blonds more than brunettes. This will have to be a point of consideration also.

The agent is another factor to be weighed in a decision on the seriousness of a burn. Short exposure to steam or fire may cause an extensive superficial burn, while electricity may cause a small superficial and a large deep area of trauma.

Certain chemicals, such as strong acids and alkalies, and certain vesicants like Lewisite, will continue their effect until removed or neutralized, a point of great importance in the wise treatment of burns.

If it is decided that the burn is a minor one, then the treatment may be executed successfully by means which would not be at all satisfactory in a major burn. These minor ones will not need hospital treatment, and general measures, other than a mild narcotic such as codeine in small quantities, or a sedative, will not be of great consequence. Usually these may be treated by cleaning the burn with xylene, ether, benzene, or similar detergent, if much soiled or covered with grease; then applying an ointment or jelly containing tannic acid, gentian violet, butesin picrate, sulfadiazine, or with vaseline gauze alone. Sterile dressings are then applied and the patient instructed to return daily, and, later on, at greater intervals, for further observation.

If the burn is mainfestly a serious or major one, or if there is potential danger of it becoming so, then the patient should be sent to a hospital or other center properly equipped to manage such injuries. Before the person is moved, however, proper first aid should be administered. This consists in giving opiates in dosage sufficient to relieve pain and thus reduce shock. This is usually ½ grain of morphine in the adult and may be repeated in half an hour or so if necessary. It is rare to overdose a patient in severe pain with narcotics. Then cover the injured surface with sterile or clean dressings. Clean sheets or towels will do if surgical dressings are not available. It is better not to use greases or ointments if the injured person is going to be treated at a hospital, as these will have to be removed before the customary institutional treatment can be started. If the case is severely shocked, blankets should be applied and the person taken to the hospital as soon as possible.

On arrival at the post where care is to be completed, the patient should be given general treatment immediately. These measures are most essential and should take into consideration that the majority of the seriously burned suffer from some degree of shock. For the first few hours a condition known as primary shock occurs. This is probably of neurogenic origin, and is not so common among healthy young men, especially those in the armed forces, as it is in the elderly, in children, and in women. It is not different from the classical shock syndrome, with pallor, sweating, rapid weak pulse, low blood pressure, cold exremities, and low temperature. This picture, if not already present, should not be awaited before beginning treatment. The best time to treat shock is before it develops. After the primary shock period, a condition frequently known as secondary or burn shock supervenes. The patient then shows evidence of toxicity, with rising temperature, restlessness, full bounding pulse, and dry flushed skin. Some have thought that this condition is due to absorption of toxic substances liberated from the burned tissues. Blalock believes, however, that fluid loss with the accompanying reduction in plasma protein accounts for this toxic effect.

Regardless of the stage of shock or incipent shock that the patient is in on admission, it is wise to begin treatment immediately. If he is patently in excellent condition, the local treatment should likewise be started, but if any doubt exists it is better to wait until the patient shows some recovery from the administration of intravenous plasma, blood transfusion, glucose, saline, or acacia solution.

There is an enormous loss of electrolytes and plasma in extensive burns. As much as 70 per cent of the blood volume may be lost in 24 hours when as little as one-sixth of the body is burned.[2] This loss takes place into the tissues by diffusion and through the injured capillaries in the burned area. Oftentimes the patient may literally be lying in a pool of his own tissue fluids. This loss must be replaced if shock is to be overcome, and is best done by plasma infusions in normal or dilute solution. The amount of normal plasma needed may be calculated roughly by hematacrit readings which are an index of the blood concentration. For every point above 45, 100 cc. of normal plasma should be given in the adult, and children in proportion to body weight. An addi-

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tional 25 per cent should be given for every gram that the total plasma protein falls below a reading of 6 gms. per 100 cc.[3] Eight to ten hours later, another reading is made, and the need for further plasma transfusion estimated. Blood transfusions are also extremely helpful, but are not so efficient as plasma because there already exists a hemoconcentration and the further addition of red cells needlessly embarrasses the circulation. A hemoglobin of 140 per cent is not long compatible with life in man, and if it is already 110 to 120 from the burn, the extra cellular elements from transfusions will obviously cause an approach to the danger point.

Crystalloid solutions such as saline or glucose are not so effectual as they diffuse readily through the injured capillaries, and their effect rapidly lost. It is estimated that when 1000 cc. of glucose or saline solution is given intravenously in shock, the entire amount will pass into the tissues in an hour's time.[4] Not only are they lost themselves, but they carry out plasma proteins with them in great abundance.

Acacia solutions more nearly approach the ideal, but have the marked disadvantage of being retained in the body. Occasionally there are severe reactions following their use.

However, in the shock following a burn, if plasma or blood are not immediately available, one of the other solutions should be given, because if the shock level is maintained for over three hours, irreversible changes take place[5] and no treatment will be of avail.

The question of lowering the head and applying heat in shock is another point of interest and discussion. Both are invaluable according to most authors, but care in the amount of heat applied should be observed. The extremities are cold because of a physiological reaction. Blood normally in the peripheral circulation is concentrated in the vital centers—the adrenals, heart, lungs, and brain. If much heat is applied to the arms and legs, a reflex vasodilatation of the peripheral vessels will result and thus increase the shock. This point has been emphasized by Blalock.[6] Usually blankets will be sufficient, unless the patient has been exposed to extreme cold.

The use of adrenal cortical hormone,[7] such as eschatin, is advocated by many prominent writers. The basis for its use is a reduction in the capillary permeability, thus causing a diminution in the loss of electrolytes and plasma. It also causes a marked retention of chlorides, much of which is lost in burns. Oxygen is administered if the anoxia from hemoconcentration is marked. Both of these therapeutic measures have limited value, and some feel that their use is of more theoretical than practical importance.

If it is decided to give adrenal cortex extract, it may be given in 1 cc. doses subcutaneously every hour until improvement takes place, or it may be given in 5-10 cc. intravenous injections every 6 hours. The first 48 hours is the optimum period for results in the use of this substance.

When it is felt that the general measures have been satisfactorily started, local treatment is undertaken.

Local therapy of major burns has been and still is a subject of much discussion, particularly since Davidson's pioneer work on the use of tannic acid in 1925.

The rationale of local treatment is based on four major principles. First: the formation of a coat or coagulum which will seal over the wounded capillary bed and prevent further loss of body fluids. Davidson[8] believed that this coagulum also served to "fix" the injured cells so that toxic substances thought to be liberated by them would be reduced in amount. Second: the prevention of further contamination by this protective coating. Third: the production of some degree of antisepsis inherent in the coagulum-producing substance. Fourth: the partial or complete relief of pain resulting from covering over exposed superficial nerve endings. In some agents this effect is made more pronounced by the presence of a local anesthetic.

Regardless of the agent used, the burn should first be subjected to a minor debridement, in which all the blisters and superficial devitalized skin are removed.

General anesthesia is not usually necessary or even advisable. If sufficient analgesia is not produced by opiates, further sedation can be induced by one of the barbiturates given orally or by rectum. The patient may be too shocked to warrant general anesthesia, or there may be concomitant injuries which make this out of the question. This is especially true in war injuries where the majority of burns are accompanied by other, and sometimes even more serious trauma. In those occasional cases where general anesthesia is desired, intravenous pentothal or evipal are invaluable.

Strict asepsis should be adhered to in order not to

contaminate the wound any further. This obtains even to the details of scrubbing, using gloves, adequate masking, etc.

Burns which are dirty, covered with oil or grease, or have foreign particles ground into them, should be cleaned gently but thoroughly. This is one of the most difficult parts in the treatment of these injuries, but good results with rapid healing and little scarring will reward painstaking efforts at this stage. A satisfactory detergent is hard to find, and it will depend somewhat on the contaminating substance as to what cleansing agent to use. If the soiling is due to earth, ordinary soap and water will be satisfactory. Grease or oil will have to be removed by a solvent first, and then cleaned with soap and water. Solvents usually used are xylol, benzene, ether, dreft or ninol. Cotton is best to use in the process as gauze further injures the damaged capillaries. Saline irrigations will complete the cleaning.

After the burn has been cleaned, it is treated with the local agent decided upon. The most commonly used are 5 to 10 per cent solution of tannic acid or a combination of 10 per cent tannic acid and 10 per cent silver nitrate, either together or separately, the tannic being used first. Other frequently used solutions are gentian violet in 1 per cent aqueous solution, and triple dye, consisting of 1 per cent gentian violet, 1 per cent brilliant green and 0.1 per cent neutral acriflavine.

Codliver oil compresses have been used successfully,[9] as has tulle gras,[10] a fine meshed gauze impregnated with paraffin, balsam of Peru and olive oil. Tanexin, thymolidine and other proprietary preparations have given good results in various investigators hands.

The closed plaster treatment[11] also has won wide approval. In this method, after preliminary cleaning, the burned area is covered with paraffin or vaseline gauze, and plaster of paris applied directly over this. The plaster is left on 10-14 days according to the amount of discharge, and is reapplied if necessary. The proponents of this plan claim less pain, much less difficulty in handling, and a speeding up of recovery.

Adams[12] believes that the usefulness of any eschar treatment is limited to first and second degree burns, and recommends saline baths and compresses for those of third degree.

In recent months sulfadiazine has been used for local application in the treatment of burns, and bids fair to become one of the most effective of all. Dr. Kenneth Pickrell,[13] of Johns Hopkins, in 1941, feeling that sulfonamide therapy was basically sound, developed a solution which would bring the drug in close contact with the burned surface, and at the same time form a thin, translucent film, which met admirably the criteria of a good anti-burn agent. It sealed over the injured area, prevented or markedly reduced the loss of plasma proteins and blood electrolytes from the capillaries, partly relieved pain, and brought an effective bacteriostatic agent into relation with the potentially infected field. This solution is 3 per cent sulfadiazine in an 8 per cent aqueous solution of triethanolamine. It was used very successfully in 115 patients, with a reduction in healing time, less pronounced scarring, and a much lower incidence of infection than in previously used methods. Only two out of the total number were infected, and the toxicity of the drug proved to be quite low, as only one of this number showed toxic effects. This patient had over 80 per cent of the skin surface burned and succumbed in 48 hours.

The procedure outlined by Pickrell is first to begin measures to combat shock, after which cultures are taken from several burned areas. While the attending surgeon scrubs, an assistant or nurse sprays the burn. This helps relieve pain so that cleansing can be done without general anesthesia. Afer an aseptic debridement the patient is transferred to his bed on which sterile sheets have been placed. It is wise, if possible, to bring the bed to the treatment room in order to save excessive moving of the patient.

The spraying is then continued according to a definite scheme; every hour the first day, every two hours the second day, every three hours the third day and every four hours the fourth day.

A cradle fitted with colored lights to prevent glare is placed over the patient and the temperature kept at 85 to 90 degrees F. This treatment produces a thin translucent eschar, and further spraying is necessary only if cracking exposes raw surfaces. The eschar begins to separate in about ten days and is cut away where intact epithelium underneath is present. Compresses of the sulfadiazine-triethanolamine mixture and sterile mineral oil sprays, followed by saline compresses, help the coagulum to separate in large sheets. The eschar in third degree burns should be left on at least two weeks and then removed for early grafting, which is a necessity for

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good recovery with a minimum of scar formation.

Sulfadiazine is rapidly absorbed, appearing in the blood within several hours. The concentration rarely approaches dangerous levels when used in this way, as it does not usually go as high as 8-10. The maximum is reached in two days and then decreases to 1-2 mgms. per cent on the fifth.

In less severe burns, the treatment is carried out in the accident room or office. Pickrell places in this category any second degree burn involving less than 20 per cent of the body surface. These cases are sprayed frequently over a period of two hours, and are then discharged with a dressing of vaseline gauze or an ointment containing 5 per cent sulfadiazine and 8 per cent triethanolamine in a stearin base. The patient returns daily, if necessary, for further spraying and similar dressings until healed.

Just recently, the sulfadiazine solution has been modified, and is said to be even more effective. Although this newer preparation has not been used on any of the cases in our series, it is now available.

This solution contains 2 per cent sulfadiazine and 2½ per cent methylsulfate cellulose (methocel), in 8 per cent aqueous triethanolamine. Aerosol in minute amounts is added as a wetting agent to insure more effective contact with the burn.

Fifty patients with severe burns and several hundred minor burns have been treated with the improved solution by Pickrell.

The technic differs somewhat because the methocel speeds coagulum formation. Consequently, the injured surface needs spraying only every three or four hours for 12 to 16 hours, and afterwards only as indicated.

Seven (7) cases have been treated at the Pulaski Hospital by the sulfadiazine method, and 2 more are undergoing treatment at the present time.

CASE REPORTS

Case 1: K. M., a 32-year-old powder plant employee, was burned on October 9, 1941, following an explosion. He suffered second degree burns of the face, ears, neck, hands, wrists and legs, including portions of both thighs. Altogether there was approximately 30 per cent of his body surface burned. He was given first aid treatment of morphine and sterile dressings, and brought to the hospital. Although the patient was not in shock, he was given intravenous fluids, and sulfadiazine sprays were begun after debridement had been done under sterile precautions without anesthesia. He ran a temperature which reached a peak of 102.4 on the fifth day, after which there was a gradual decline. On the second day the drug concentration was 5, and on the fourth day it had gone down to 1½. The sprays helped his pain moderately, but it had to be controlled further with opiates and sedatives. A definite eschar began to form in 8-10 hours and by the third day coagulation was complete. Occasional spraying was done after this as it seemed to relieve his pain. A mild infection developed between his fingers, and another at the edges of the burn on his left leg. However, it was not at all severe, and cultures showed the causative organism to be staphylococcus aureus. The infection cleared rather rapidly. On October 19th, mineral oil sprays were begun, and by the 21st most of the eschar could be removed. The results in this burn were excellent, there being very little scarring, and but slight contracture of two fingers on each hand. The new skin was rather tender for a long time, and had a tendency to itch and burn, but probably no more than would be expected in any case. The patient was discharged November 27, but could have left sooner if necessity demanded.

Case 2: B. L. M., a 10-year-old girl, was burned on the left side of her abdomen, chest, and thigh when her dress caught fire on a stove on February 3, 1942. About 10 per cent of her skin surface was involved in second degree burns. A debridement was done, and sulfadiazine sprayed on in the usual manner until the fourth day. After this it was done less frequently. No intravenous medication was deemed necessary. On the second night, her temperature was up to 103.4 but dropped after forcing fluids by mouth. There was no hemoconcentration, the hemoglobin remaining at 92 per cent. Urine showed a one plus albumin on the third day, but none thereafter. In this case the pain was relieved after the third spraying, and a nice eschar was formed by the second day. There were no toxic effects from the drug, and the patient left the hospital on February 14, in good condition. Final healing took place without scar or contracture.

Case 3: A. L. K., a 38-year-old man, was admitted on November 7, 1941, with second degree burns of his right hand resulting from inadvertent immersion into a vat of oil at 400 degrees Fahrenheit. The blisters and loose skin were removed, and the sulfadiazine sprayed on as in the other cases. Intense pain at first required large doses of morphine, but pain became less after the first spraying. It recurred from time to time, and opiates had to be administered over a period of four days. Edema of the hand occurred, but practically no infection, and eschar formation was complete in about two days. Except for a trace of albumin, urinary and blood findings were normal. His temperature never rose above 99.6. He was discharged on November 11, with vaseline gauze dressings on his hand, and was followed thereafter in the office. Healing took place in about two weeks after discharge, with no residual scarring or contracture.

Case 4: W. A., a 16-months-old baby, was burned on January 25, 1942, when her clothing caught fire on the kitchen stove. The second degree burns were debrided and sprayed frequently in the hospital for an hour and the patient sent home, following the application of vaseline gauze dressings. Similar treatment was given the

following day. On the third day she developed a severe upper respiratory infection and was admitted to the hospital. No pneumonia had occurred, but sulfathiazole was started as a precaution. The temperature was 103 on admission on January 27, and went up to 103.8 the next day, but dropped rapidly to normal by January 31. She had daily, and sometimes twice daily, dressings of sulfadiazine and vaseline gauze. The wounds healed nicely without infection, and without significant scarring.

Case 5: L. M. A., five-year-old colored girl who received injuries from burning clothes when she was playing with matches on March 25, 1942, was admitted for treatment. The burns involved a large part of the abdomen, and the inner surfaces of both thighs, in addition to a burn of the right wrist. Altogether about 25 per cent of the body surface was burned. The areas on the abdomen were of second degree, and on the thighs, of third degree variety. Her temperature never rose above 100.4, and that was on the second and third days. The hemoglobin remained at 95-100 per cent and the urine showed a one plus albumen, which disappeared by the third day.

Her burns were debrided as usual and then sprayed according to the suggested routine. On March 28, boric acid compresses were started on the thigh burns because of mild infection resulting from constant picking at the eschar by the patient. She needed no narcotic and no intravenous fluids were given. She had moderate pain when the coagulum was removed from the third degree burns. The abdomen was completely healed before she left on April 17, but the legs were still granulating and had to have dressings applied. On April 21, about half of the thigh wound surface had epithelized, and the rest may need grafting.

Case 6: B. H., a ten-year-old girl whose clothing caught fire on burning brush on April 18, had third degree burns of 65 per cent of her body. The trunk, both anteriorly and posteriorly, was completely involved, and both thighs and portions of both arms were burned. Her condition was critical from the beginning. Large doses of morphine were given for pain and then a debridement was done.

The sulfadiazine sprays were then begun, and treatment for shock instituted. The blood pressure never registered from the beginning. The hematacrit reading was 67 per cent, white blood count 56,500, and hemoglobin 100 to 102. Plasma was given in quantities sufficient to bring the hematacrit down to 48 per cent by the following day. Glucose and citrated blood were also given on the day after admission. Suprarenal cortex in 1 cc. subcutaneous doses had little if any effect. The kidneys failed to function and the patient died about 36 hours after admission. No observation on the efficacy of sulfadiazine can be made on a case of this kind. A good eschar had formed within the first eight hours, and very little fluid escaped from the burn surface. There was such a complete collapse of the peripheral vessels that fewer blood studies than desired were done.

Case 7: B. F., a 42-year-old man, admitted on November 19, 1941, was burned from a powder explosion at the powder plant. He had first and second degree burns of his face, both hands, and wrists, neck and both ears. He was not in shock, but was given first aid and brought to the hospital. Started on sulfadiazine sprays in the usual manner, and required only a few hypodermics of morphine on the ensuing days. His blood pressure on admission was 126/78, and laboratory studies were normal. Sulfadiazine concentration never showed more than a trace. His temperature went to 102 on November 22, from a respiratory infection, but dropped promptly to normal with sulfathiazole by mouth. There was practically no evidence of infection, and the face healed before he left the hospital on November 29. The hands developed a good deal of edema, but this subsided before discharge, and healing was well under way, except for one finger which was still swollen and stiff when he left. This patient was anxious to be near his home, so he was transferred to a hospital in another city, with vaseline gauze dressings on his hands, on November 29. The final result is therefore not known, but, from the appearance when he left, it is reasonable to suppose that he would not have more than slight contracture of one of his fingers. This patient said in regard to pain that the sprays "stung" for a while, and then made the burns feel much better.

Case 8: C. T., a 33-year-old man, admitted on April 20, 1942, was burned on the face, ears, and both hands from a kerosene flash. They were mostly first degree, but partly second degree burns. Morphine necessary only once. A few blisters were removed, but otherwise debridement was not necessary. Aside from a hemoglobin of 105, laboratory findings were normal. Blood pressure was 128/70 and his physical examination revealed nothing of importance besides the injuries. The usual sulfadiazine sprays were used and the intact epithelium began to have a dusky gray appearance on the first day. Moderate swelling of the face and hands subsided on third day. This patient states that the solution eases pain after an initial period of burning and stinging. He is still in the hospital and it is too soon to estimate the final results.

Case 9: C. R., a 30-year-old man, was admitted on April 20, 1942, for first and second degree burns of face and both arms from the wrist to the middle of the upper arms. They were caused by a flash back from kerosene. Morphine was necessary once on the day of admission, twice the next day and once the third day. Sulfadiazine sprays have been used, with eschar formation on the second degree areas on the second day and the production of grayish discoloration of the remaining epidermis in other areas. He states that the solution burns for awhile and then causes relief. His blood pressure was 140/80 in the popliteal artery on admission. Urine was negative except for a few blood cells and blood examination showed a r.b.c. of 5,130,000 and hemoglobin of 102 per cent. There were 13,800 w.b.c. No measures, other than opiates, were used to combat latent shock, as the patient seemed in excellent condition. This patient is still in the hospital and it is too soon to estimate his final result, but so far his progress has been most satisfactory.

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SUMMARY

1. The importance of a simple and effective treatment of burns is emphasized.

2. The general treatment of major and minor burns, including first aid therapy, is discussed.

3. Various procedures of local treatment are outlined, particular attention being given to the use of sulfadiazine solutions and ointments.

4. Case reports of burns of varying intensity are reviewed briefly.

CONCLUSION

The satisfactory handling of burns demands intelligent first aid, insistence on adequate control of shock with the present means at our disposal, which include administration of suprarenal cortex and restoration of fluids by plasma infusion, and blood transfusion when indicated; and control of anoxia by oxygen. Infection must be avoided if possible by careful debridement and use of proper local agents. Among the newest and most valuable of these is sulfadiazine dissolved in triethanolamine. This produces a pliable translucent eschar, with anesthetic and bacteriostatic properties. It is safe to use, even around the eyes, and general toxic reactions are rare. Loss of tissue fluids is reduced to a minimum when the coagulum forms. The ultimate healing is characterized by a reduction in scar tissue, and the period of epithelization is undoubtedly shortened by this material. The excellent results obtained by Pickrell, Adams, and others in its use justifies a more universal trial, and it is probable that sulfonamide therapy will add another splendid result to is long list of successes.

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THE INTER-RELATIONSHIP OF DENTISTRY AND OTOLARYNGOLOGY*

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A paper covering the inter-relationship of dentistry and otolaryngology, qualifying all statements, would require a complete treatise on both subjects. This presentation will be limited to a correlation showing the relationship existing between these specialties as related to inflammatory symptoms, stressing the relationship to pain. Mention will also be made regarding hemorrhagic conditions and the relationship of otolaryngology to orthodontia.

The practices of dentistry and otolaryngology are specialities dealing with a very small, complex, functional, portion of the human body. Both are concerned with the relationship of infirmities as related to the whole body mechanism. The teeth and the nose and throat are adjacent structures, thus making our work closely related and overlapping. Indeed, at times it takes a thorough study by both to determine who can cure the patient of his symptoms. Likewise, the dentist and the nose and throat specialist have the same motive: the prevention, alleviation, and cure of infirmities.

Education of the public has done much to promote preventive care. However, the large majority of our patients still present themselves because of

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symptoms. Analysis discloses that these usually are primarily of an inflammatory nature, i. e., redness, swelling, heat and pain, frequently resulting secondarily in disordered function and muscular spasm. Bleeding is another important symptom. Patients are apprehensive about bleeding and present themselves early to determine its cause and correction.

The diagnosis of a patient's condition requires an analysis of the subjective and objective findings to determine the cause. The treatment depends upon these findings. Pain is the most annoying and confusing of these symptoms to interpret. Pain indicates irritation but is not always localized to the site of the irritant. It may be referred. The area to which the pain is referred receives its sensory nerve supply from the same spinal segment or ganglion as does the involved area. Pain or the absence of pain must be considered with the other symptoms and signs in making a correct diagnosis.

A few of the nose and throat conditions closely related to dentistry, with pain as a frequent major subjective symptom, are as follows:

1. Maxillary sinusitis usually follows an acute infection of the nose. The symptoms of acute maxillary sinusitis are pain over the antrum, pain in the canine and upper premolar teeth, lethargy, headaches, and a purulent discharge from the nostril. The diagnosis is made by the history, frequently by eliciting pain upon pressure over the antrum, transillumination, and x-ray. Maxillary sinusitis may result by extension of infection from a tooth. The canine and upper premolar tooth roots are separated from the maxillary sinus floor by a very thin layer of bone. The possibilities are as follows: The tooth may abscess without rupture; the abscess may slowly rupture the bone, being walled off here to form a circumscribed sinusitis; or the force of the rupture may spread the infection to the sinus cavity, causing empyema. The removal of a tooth may leave a fistulous tract which is always a potential maxillary sinusitis. The mouth contains both aerobic and anaerobic organisms. When a fistulous tract is present, a method of cleansing the mouth should be carried out to prevent infection of the maxillary sinus from the mouth. Edema and tenderness of the soft tissues over the maxillary sinus is usually due to a cellulitis arising from infection around the root of a tooth, and not from infection within the walled off maxillary sinus.

The management of maxillary sinusitis depends upon the cause and duration of the infection. Sinusitis resulting from nasal infection will not be further considered except as related to tooth pain. Maxillary sinusitis resulting from an abscessed tooth requires the tooth's removal, and all bone and tooth root fragments must be carefully curetted. The infected sinus with a fistulous opening should never be irrigated from below. The proper care requires irrigation from above through the nostril at regular intervals of four or five days, and the use of a mouth wash to eliminate infection which might extend through the fistulous opening and reinfect the sinus. The purpose of the treatment is to keep the sinus clean from above and to close the fistulous opening as quickly as possible. The fistulous opening might close spontaneously if it is small. After treatment for two or three weeks an idea may be obtained about the result. If the fistulous tract does not close spontaneously a plastic mucosal flap can be dissected out and sutured into place covering the tooth socket by a wide margin. If an abscessed tooth or an infected tooth socket has infected the maxillary sinus wall over a long period of time—usually after two months—the mucosa lining the sinus becomes thickened. Then irrigations will only wash off the surface of the thickened and infected mucosa. These treatments are of little avail. An operation designed to remove the infected mucosa is the only means of obtaining a complete cure. This is a Caldwell-Luc operation, which is carried out through an opening made in the canine fossa. The thickened mucosa is completely removed from the antrum and an opening is made beneath the inferior turbinate into the nose. The operative site is closed by sutures. The fistulous tract is carefully curetted and closed during the operation by the oral surgeon. The maxillary sinus is kept clean from above until healthy mucosa regenerates from the nose to cover the sinus cavity. This procedure is successful in a very high percentage of cases.

2. Fractures of the face are quite frequent today, resulting from automobile accidents and industrial hazards. The typical type represents a linear fracture of the maxilla, extending through the hard palate, the alveolar arch in the region of the canine tooth, the maxillary sinus, and the floor of the orbit to the fronto-zygomatic suture. In addition the nasal bone and mandible may be frac-

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tured. If the fracture extends to involve the cranial vault there is danger of intracranial infection. Bleeding from the ears or x-rays showing a fracture of the cranial vault would indicate the use of a sulfonamide drug. The reallignment of the teeth, the setting of the mandible, and the subsequent care of the mouth is a dental problem. The care of a depressed fracture of the maxillary sinus is a nose and throat problem which requires its reduction by a modified Caldwell-Luc operation. An atypical injury would result from crushing blows and would require treatment depending upon the extent of the damage done.

3. Temporo-mandibular dyscrasias have been brought to the attention of the dentists and nose and throat specialists frequently in the recent literature.[1]

(a) It was found that the absence of teeth throws the temporo-mandible joint out of alignment, causing disarticulation with resultant wearing of the joint, pain, and dysfunction. In addition, the muscles of the pharyngeal wall whose action is to open the eustachian tube mouth are shortened between their origin and insertion, resulting in tubal catarrh which causes deafness and pain. The correction of temporo-mandibular dyscrasia is accomplished by correcting the bite of the teeth.

(b) The temporo-mandibular joint is involved more frequently in rheumatoid arthritis than any other joint.[2] There is tenderness and swelling of the joint, and symptoms of pain in front of the ear, usually upon moving the mandible in talking or chewing. The treatment is carried out by the removal of toxic foci of infection, the correction of the bite, the use of salicylates, and systemic care.

4. Ear conditions are quite painful, and may be confused with a molar tooth involvement. They are as follows:

(a) External otitis media causes a swelling of the external ear canal with pain and tenderness usually localized to this area. Pain or manipulating the lobe of the ear is usually pathognomonic of an external otitis.

(b) Acute and chronic catarrhal otitis media give symptoms of pain deep in the ear region usually following an upper respiratory infection or other condition causing closure of the eustachian tubes. Objectively, the drum is slightly discolored and retracted with some loss of hearing for the low tones.

(c) An acute purulent otitis media usually results from extension of infection through the eustachian tube from the nasopharynx, and is characterized by a throbbing pain in the ear, an elevation of temperature, and loss of hearing. The ear drum is always completely discolored. In the advanced stages the drum is bulging or ruptured with a purulent discharge pouring through the drum. The temperature in acute otitis media gives an excellent indication of its severity, and in an uncomplicated case after spontaneous rupture of the drum or myringotomy the temperature is normal. An exception occurs in a very virulent infection or in a case with a low resistance. Here the temperature may be sub-normal. Insufficient drainage or a mastoiditis is usually accompanied by a temperature elevation but we must be constantly on the alert for mastoiditis characterized by an abnormal temperature. A culture of the ear discharge is of value in determining the type of organism present and the sulfonamide to use. After two weeks a discharging ear is always suspicious of mastoiditis. X-rays are very valuable in diagnosis.

5. Tonsil infection is a cause for pain which may be confused with tooth pain.

(a) Acute tonsillitis and extensive chronic tonsilitis cause pain in the throat at times referred to the ear and the neck on the same side. When the pain is referred to the neck we can often palpate enlarged cervical glands at the angle of the jaw extending downward into the neck.

(b) A peritonsillar abscess, or quinsy, is a result of chronic tonsillitis with rupture of the purulent material into the fascia space behind the tonsil. It is characterized by intense pain in the throat, often extending to the ear and jaw on the same side. The patient cannot open his mouth due to the extreme swelling. Eating, talking, and swallowing are extremely difficult. The diagnosis can be confused with the abscess of a third molar tooth. However, the history of its development with tonsilitis and the absence of tooth cavities is of great assistance in making a diagnosis. Treatment by incision and drainage give dramatic relief. After the swelling has subsided the probability of an abscessed tooth can usually be ruled out.

6. If we exclude tic douloureux, primary neuritis of the trigeminal is rare, although it may occur secondarily to disease processes at the base of the skull.[3]

(a) Tic douloureux is a paroxysmal excruciating, radiating pain which comes on instantaneously and lasts for only a few seconds. It is limited to the distribution of the trigeminal nerve, usually involving the second division, but the first or third may be involved. The patient is afraid to talk, eat, wash or touch the face for fear of precipitating an attack. The teeth, nasal sinuses, and bones are thought to be causes involved in a mild neuritic process. A careful examination is made for trouble, supplemented by x-rays of the sinuses and teeth. All faulty teeth and tooth fragments are removed. Temporary relief may be obtained by the use of trichlorethylene inhalations. The treatment is for the most part surgical, requiring injection or section of the nerve surgically.

(b) There are many cases of atypical facial neuralgia, which, unlike tic douloureux, present atypical symptoms and distribution.[4] The pains are not sharply neuralgic, but dull, burning or aching; not in the course of the nerves, but in the orbit, cheek, head, and neck; they last for hours, days, and months, and do not respond to treatment. They probably are sympathetic and vasomotor in origin. Some believe they are psychogenic.

7. Benign and malignant tumors of the ear, nose, throat and teeth are occasionally seen in our specialties. A few will be described as follows:

(a) A benign tumor in the nasopharynx causes enlargement and dysfunction. Certain types act as malignant tumors due to the rapidity of growth and pressure necrosis.

(b) The malignant tumor of the nasopharynx originates in Rosemuller's fossa and is characterized by a sensation of fullness; difficulty in hearing due to closure of the eustachian opening; pain in the ear on the same side of the face; occasionally bleeding; and later paralysis involving the cranial nerves, usually the sixth, third, fourth and fifth nerves. When advanced the patient dies due to intracranial extension. The treatment of benign types requires their removal. The malignant types are treated by x-ray and radium.

(c) Tumors of the tonsils may be benign or malignant. A biopsy determines the method of treatment. If the tumor is broken down with extension ulceration it is often difficult to make a diagnosis of malignancy by inspection alone. Syphilis, Vincent's infection, and tuberculosis may be causative factors. Frequently it is necessary to take repeated biopsies in order to make a diagnosis of malignancy. At times there may be an over-lapping where all of the conditions may be present in the same case.

(d) In the mouth we find leucoplakia as a white, hard, smooth area involving the tongue or buccal mucosa. This is always a precancerous condition, aggravated by faulty dental hygiene, the use of alcohol, and tobacco. The treatment requires the correction of the teeth and abstinence from the use of alcohol and tobacco. Vitamin therapy may prove useful, but a complete surgical removal may be necessary.

(e) Cancer of the tongue demands surgical removal.

(f) There is a tumor developing within the alveolar border of the jaw from the para-dental epithelial remains of the enamel organ, an adamantinoma, which is a slow growing malignancy requiring surgical removal and deep x-ray therapy.

(g) Tumors of the external ear are usually malignant, causing a blockage, pain, and bleeding from the ear. They are treated by x-ray after biopsy study.

(h) Tumors, likewise, may involve the bones arising from any location.

8. Painful swellings frequently occur about the face.

(a) The salivary glands, namely, the parotid, sub-maxillary, and sub-lingual may be involved by infection, stones, ranulae, or tumors. Infection may extend to the glands via the salivary ducts from the mouth. An enlargement, pain, and tenderness with an elevation of temperature follows. Mumps usually occurs during childhood and is probably caused by a filtrable virus infection. The diagnosis is made by the absence of infection in the mouth and the history of contact with a known case or by its occurrence during an epidemic. Stones may occlude the ducts, causing an increase in swelling of the glands following the ingestion of foods. The swelling subsides

after eating. A stone may be passed spontaneously or have to be removed surgically. A ranula is a cystic tumor beneath the tongue, due to obstruction and dilatation of the maxillary or sublingual duct. It is soft and fluctuant. It is treated by removal of the obstruction and surgical removal of the dilatation later if necessary. Tumors may arise in the sub-maxillary ducts and glands, being either benign or malignant. Like tumors elsewhere, the diagnosis is made by a biopsy study. They are treated surgically or by x-ray, as indicated by the findings.

(b) A mastoid infection may perforate to the exterior, forming an abscess under the periosteum, called a sub-periosteal abscess. This is usually located over the mastoid but may form beneath the mastoid tip at the angle of the jaw, being termed a Bezold abscess. This enlargement may confuse the examiner if he is not alert to its possibility.

(c) Ludwig's angina[5] is a painful swelling beneath the tongue due to a cellulitis about the submaxillary or sub-lingual glands, which spreads in the planes of connective tissue to the sub-lingual region. It is a serious condition because it may extend downward into the mediastinum. It is characterized by a painful swelling in the floor of the mouth, which pushes the tongue upward, preventing closure of the mouth. The temperature is elevated and the patient is dyspneic. The cause may be delayed development of a third molar tooth, necrosis of the tooth and alveolar process taking place, and an abscess forming. The treatment is surgical drainage beneath the chin or through the floor of the mouth.

(d) Hodgkin's disease is characterized by a painless progressive enlargement of lymph nodes, often accompanied by fever, and in the late stages by cachexia and anemia.[6] The onset of the disease is occasionally preceded or accompanied by infections about the teeth or tonsils. Characteristically the cervical lymph nodes enlarge. The treatment is medical and by x-ray therapy.

(e) Tuberculous cervical lymph nodes[6] may simulate Hodgkin's disease. The diagnosis is made from the history, physical findings, tuberculin tests, pain over the glands, and x-rays revealing calcification of the glands.

(f) Lymphocytic leukemia[6] may cause enlarged cervical lymph-glands. It is diagnosed by a study of blood smears. The treatment is medical.

(g) Acute infectious mononucleosis[7] is a disease characterized by an elevation of temperature, acutely inflamed tonsils and enlarged tender cervical lymph nodes. The diagnosis is made by a study of blood smears. It disappears spontaneously in about two weeks.

(h) Lymphosarcoma may simulate Hodgkin's disease.[6] When it affects the cervical and submental lymph nodes the tonsils are frequently involved and greatly enlarged. The diagnosis is made by a histologic study of the lymph nodes.

(i) Syphilitic gumma[6] may arise from the cervical region. A positive Wassermann aids in the diagnosis.

9. Painful infections of interest to us include:

(a) Vincent's angina[8] which is an infection caused by symbiosis of a spirochete and a fusiform bacillus which flourishes in the mouth due to a lack of oxygen. It causes inflammation of the oral mucosa, and frequently deep ulcers in the mouth, tonsils, and pharynx. The diagnosis is made by the clinical appearance and a smear obtained from the affected area stained to show the presence of fusiform bacilli and spirochetes.

(b) Cellulitis of the face may result by a direct extension from an abscessed tooth or an infected tooth socket. As stressed before, this condition will not arise from sinusitis. Erysipelas of the face represents itself as a very red tender skin involvement extending to the hair line where it is sharply demarcated. The diagnosis is made by the clinical appearance, the high temperature, and extreme toxicity. It is treated by the sulfonamides.

(c) Agranulocytosis[9] is a blood dyscrasia characterized by a depression of granulocytes in the blood. It is known to be caused by barbiturates, sulfanilamide, and other drugs, used over a long period of time. Probably there is an allergic factor, although the exact mechanism of causation is unknown. Initially the condition begins with a temperature, sore throat, and diffculty in swallowing. When advanced, ulceration and necrosis occur of the mouth, pharynx, and larynx. The treatment is medical.

Syphilis manifects itself when congenital as Hutchinson's teeth, a saddle nose and impairment of hearing of varying degree, characterized by a loss for high tones. In the acquired type there is

frequently an initial chancre of the lip, mouth, tonsils, or pharynx. The secondary state is manifested by macules over the oral mucosa with usually a complaint of sore throat. In the tertiary or late syphilis the patient complains of a sore throat of many weeks' duration. The negroes entering the Medical College of Virginia Hospital Clinic with a complaint of chronic sore throat had a routine Wassermann test. About half of them were positive. In congenital and acquired late syphilis an anterior perforation of the septum is quite characteristic. Obscure pains and neuralgias, and unexplained ulcers of the hard and soft palate and the tongue are frequently luetic.

Hemorrhagic diseases[10] involving the nose and throat include scurvy, purpura and hemophilia. Scurvy is caused by a deficiency of vitamin C; when advanced it is characterized by bleeding, tender gums, loose teeth, and pain. It is treated by the administration of vitamin C. Purpura is a condition characterized by hemorrhages beneath the skin and mucosa. It usually involves the gums and oral mucosa. A faulty bleeding time is the cause. The treatment is medical. Hemophilia is an hereditary condition which occurs only in males, being passed on through females. It is characterized by hemorrhage after trauma. Even small cuts bleed incessantly and endanger life. The treatment is medical.

Malocclusion may result from mouth breathing, thumb sucking, or similar habits. The resulting ugly mouth deforms the face. The individual is handicapped by the physical deformity and may develop an inferiority complex resulting in a poor social adjustment. A child with large adenoids breathes through the mouth. A high palatine arch develops, the teeth protrude; malocclusion and facial deformity follow. The removal of adenoids and large tonsils, when indicated, is recommended by the orthodontist as one of the corrective measures for these cases.

The relationship existing between dentistry and otolaryngology is very intricate. A broader perspective may be secured by an exchange of view points.

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INTRAVENOUS ANESTHESIA IN OBSTETRICS*

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The short acting barbiturate, pentothal sodium, because of its ease of intravenous administration and the smooth and quick induction of anesthesia with rapid recovery, seems particularly applicable to obstetrics. The successful use of this agent in many clinics for a myriad of surgical procedures, and the few though favorable reports of its employment in obstetrics, prompted this study.

Evipal soluble had been tried but abandoned as difficulty was encountered in gauging the depth of

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anesthesia in the patients who received analgesic drugs during labor.

The earliest recorded use of intravenous anesthesia appears to be the report of Pirogoff and Von Flour in 1847. They used ether, but because of its high mortality it was abandoned. Several other agents have been used but seem to have enjoyed only a brief and local popularity. In 1872 Ore reported on the intravenous use of chloral. In the early years of the twentieth century a remarkable series was published by Federow who used hedonal. Some years later Gwathmey used ether in Ringer's solution and subsequently reported on trichlorisopropyl alcohol given intravenously.

The barbituric acid compounds were introduced as intravenous anesthetics in 1929 when sodium amytal was used. Post-operative restlessness, prolonged recovery, and inadequate relaxation led to its discontinuation. Tabern and Volwiler developed pentothal sodium which was first used clinically by Lundy at Mayo Clinic in 1934. Since then, some 54,851 cases have been reported in which this drug was used with almost universal praise of its properties; 14 deaths are recorded by these authors, 7 of which might be attributed to the anesthetic.

This report deals with our experience in using pentothal sodium intravenously in 100 obstetrical cases. No attempt was made to select the patients for intravenous anesthesia, though, at first, it was given timidly to patients who had received heavy sedation during the first stage of labor. With increasing familiarity with the drug, it was realized that this was not a contra-indication. Fetal apnea was anticipated because of the known respiratory depression of the drug. Remarkably little of this was encountered.

Employing a 2 5 per cent solution of pentothal sodium intravenously for anesthesia, the following obstetrical operations have been done:

Spontaneous delivery, with or without episiotomy	6
Low forceps extraction, with or without episiotomy	48
Mid forceps extraction, with or without episiotomy	25
Internal podalic version and extraction	6
Breech extraction	5
Hysterotomy (early and late)	2
Dilatation and curettage	9

The maximum dose necessary was 1500 mg., the minimum 175 mg., and the average was 625 mg.

During the first stage of labor, analgesia was obtained with a combination of morphine, hyoscine, sodium amytal, and rectal ether. These drugs were given as the needs of the individual patient seemed to indicate, and many of the patients received all of them and in some instnaces the drugs were readministered if needed.

When the cervix was judged to be fully dilated, preparation was made for delivery; pentothal sodium was given intravenously. A perineal nerve block was performed with 1 per cent procaine, and as the head was delivered, the intravenous injection was discontinued.

For dilatation and curettage pentothal sodium was the only drug used, except that a preoperative hypodermic of atropine was given to abolish overactivity of the parasympathetic nerves. In the Cesarean section cases, the abdominal wall was infiltrated with procaine and the pentothal administration begun just before opening the uterus. During closure of the abdomen, the needle was withdrawn from the vein.

In this series of 100 cases, there were no maternal deaths, nor any complication due to the anesthetic. There were 6 instances of puerperal morbidity, but these patients recovered promptly and were able to leave the hospital within ten days. The usual criteria of temperature of 100.4 F. on two successive days was the index of morbidity.

There was no technical difficulty which could be ascribed to the anesthetic. We believe, as do others, that it is advisable to administer oxygen, since the depression of respiratory depth produces anoxemia and sometimes cyanosis. A patent airway must be maintained by holding the patient's jaw forward or by mechanical aid if needed.

There were two fetal deaths in this group. The first was a four and one-quarter pound twin, whose mother was moderately toxic and in labor prematurely. The second fetal death occurred in a patient who was referred after eighty hours of labor. The fetal heart was not audible at the time of admission. With the exception of these two infants, no fetal apnea of any consequence was encountered. Many of the children breathed immediately with no attention. In some, it was necessary to aspirate mucus from the pharynx, and in a few instances, oxygen was also administered.

SUMMARY AND CONCLUSIONS.

1. 100 obstetrical cases are reported in which pentothal sodium was given intravenously as the

general anesthetic agent.

2. There were no maternal complications due to the anesthesia.

3. There were two fetal deaths—one a premature infant, while the second was dead in utero on admission to the hospital.

4. Fetal apnea was conspicuous by its absence.

5. The ease of induction of anesthesia and the smooth recovery without headache and nausea have been very impressive.

6. There was no appreciable change in pulse or in respiratory rate, though a definite change in depth of respiration was produced. Cyanosis occasionally occurred; it was quickly corrected by oxygen administration.

7. Pentothal sodium has been very satisfactory in our hands and is a distinct adjunct to the obstetrician's method of relieving pain.

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Medical Arts Building.

THROMBOSIS OF CAVERNOUS SINUS
Report of a Case*

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The systemic signs and symptoms of infectious thrombosis of the large venous sinuses are more or less similar regardless of the sinus involved.

Proptosis and ocular edema are the first local signs of the infective type of thrombosis of the cavernous sinus. Papilledema is not invariably present in cavernous sinus thrombosis, but when it does occur it is one of the outstanding diagnostic local signs. The diagnosis may be confused with an orbital infection, but, unless the cellulitis of the orbit is secondary, papilledema is not present in an orbital infection. The etiological factor is usually the extension of the contiguous infection to the sinus. Cavernous sinus thrombosis is usually unilateral, but some authorities estimate a very high percentage of bilateral involvement. The connection that exists between the two sinuses makes it so easy for the infection to travel, that the uninvolved sinus is most vulnerable at all times.

The rarity of recovery and the infrequency of the condition make it of sufficient importance for a report of this case.

Another interesting point in this presentation is that the pathological report on the eye removed confirmed the diagnosis. In looking up the literature on this subject, I have been unable to find a case report of unilateral cavernous sinus thrombosis, with recovery, in which a pathological report of the enucleated eye was made.

Mrs. E. H., aged thirty-two, was admitted to St. Vincent's Hospital, Norfolk, Va., December 23, 1938, with a history of having picked a small pimple on the nose a few days before admission. The infection had spread rapidly and soon thereafter she became very ill and toxic. The entire face was red and swollen and had the appearance of erysipelas. The upper lip was swollen and hard with a carbuncle-like formation on the right side, the swelling extending outward on the right jaw and upward around the right orbit. The right eye ground was normal. No cervical rigidity, reflexes normal. In the right axilla and base were many coarse and medium râles. Abdomen flat and soft.

Laboratory Report.—Red count 4,310,000; leuco-

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cytes 18,000; polymorphonuclears 87 per cent; small lymphocytes 8 per cent; transitional 2 per cent; and hemoglobin 85 per cent. Wassermann was negative. December 28, the blood culture was positive, staphylococcus aureus. Culture made from the initial infection was staphylococcus aureus.

The treatment consisted of sulfanilamide with sodium bicarbonate, X-ray therapy of face, and several blood transfusions. The sulfanilamide and X-ray therapy were discontinued on December 26.

On December 31 I saw this patient for the first time (Fig. 1). There was considerable proptosis of

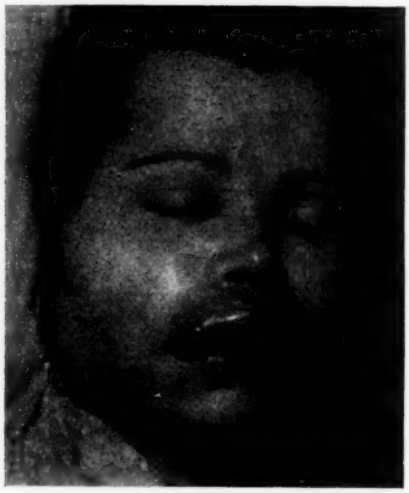

Fig. 1.—Photograph of patient before operation.

the right eye with edema of upper and lower lids. The movements of the right eye were markedly limited in all directions. The fundus examination showed a papilledema of 3 diopters. The ophthalmoscopic examination of the left eye showed no pathology and very slight swelling of the eyelids. Diplopia was an annoying symptom. The papilledema gradually increased and multiple retinal hemorrhages occurred in the periphery of the fundus. The patient developed a total ophthalmoplegia with pupil widely dilated, and could only count fingers with the right eye.

On January 11 the proptosis had increased, the papilledema and retinal hemorrhages had increased, and the vision in the right eye was only light perception. The retinal hemorrhages involved the entire periphery of the fundus. The edema of the lids and conjunctiva had increased. The left eye was normal with no edema of eyelids.

On January 16 the pain back of the right eye became so severe that no relief could be given this patient. The eye was more proptosed, with no perception of light, and the pupil widely dilated. The

Fig. 2—(× 30). Photomicrograph of a section through the optic nerve-head.

temperature was 99 degrees F., pulse 48, and respiration 20.

Laboratory Report.—Hemoglobin 70 per cent; red count 3,520,000; leucocytes 7,500; polymorphonuclears 72 per cent; small lymphocytes 22 per cent; large lymphocytes 3 per cent; transitional 1 per cent; cosinophiles 2 per cent; n.p.n. 30 mg.

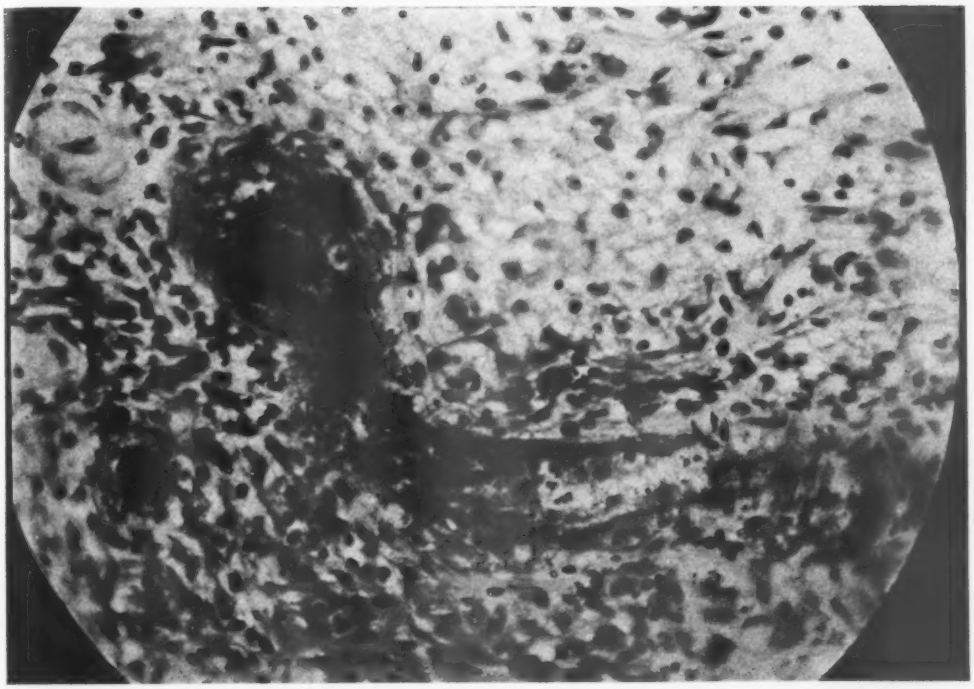

Fig. 4.—(× 400). Photomicrograph of a section through the optic nerve-head.

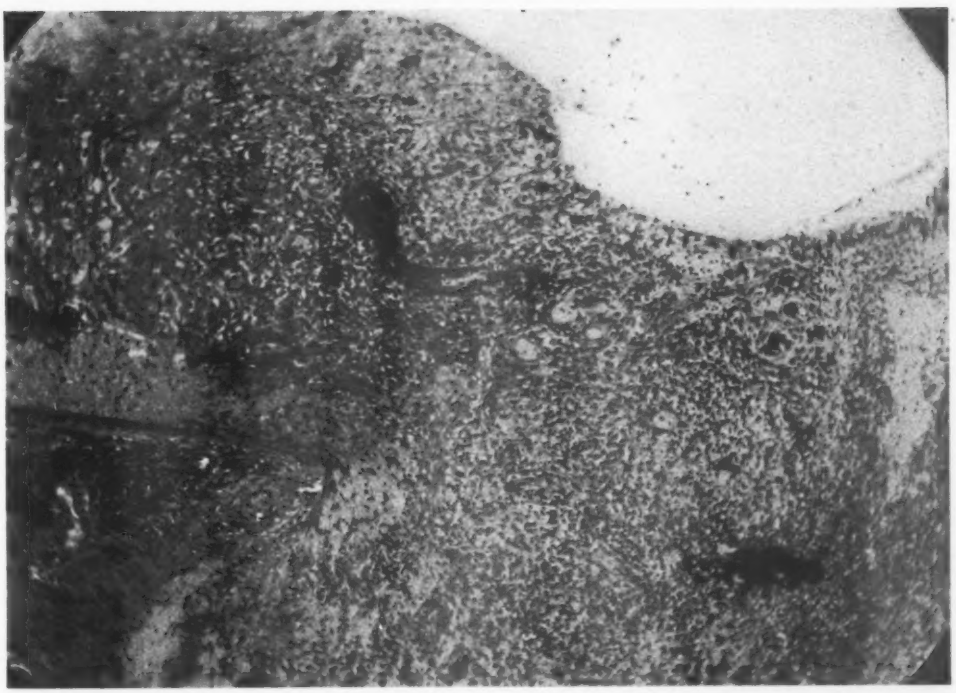

Fig. 3.—(× 100). Photomicrograph of a section through the optic nerve-head.

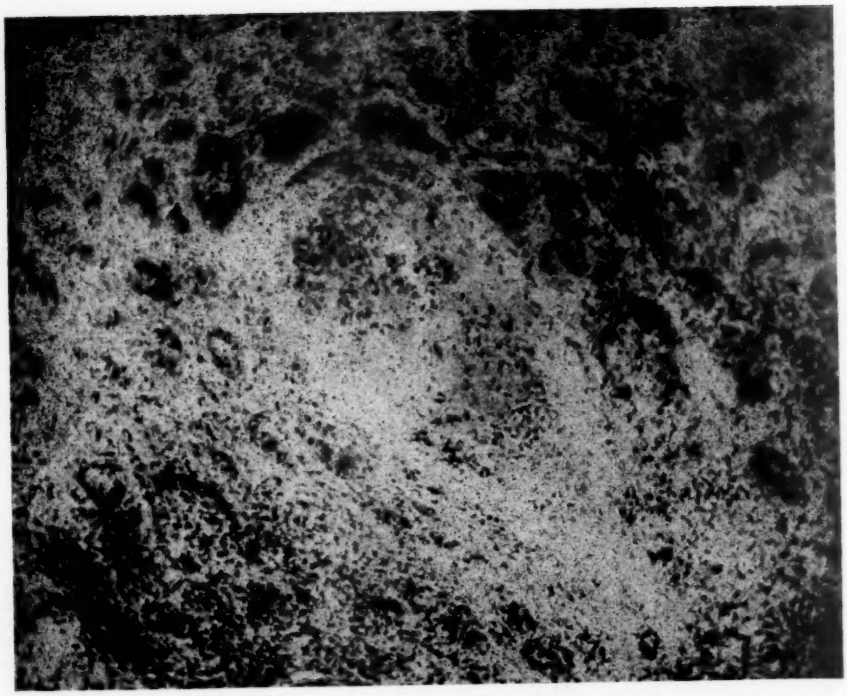

Fig. 6.—(× 240). Photomicrograph of a cross section of optic nerve-head. U. S. Army Medical Museum Negative No. 71084.

Fig. 5.—(× 240). Photomicrograph of a cross section of optic nerve-head. U. S. Army Medical Museum Negative No. 71083.

Under ether anesthesia the right eye was enucleated. After the eye was removed a small indurated mass could be felt at the inner extremity of the sphenoidal fissure, which was the ophthalmic vein just before terminating in the cavernous sinus. No attempt was made at this time to open this, but a strip of gauze was passed down to the mass for drainage, and fortunately it ruptured spontaneously the following day. The pain was relieved and there was purulent discharge for three weeks. The temperature fluctuated between 100-104 degrees during this time.

Several blood transfusions were given after the operation and bacteriophage was injected in the orbit at the operation and several times thereafter.

Fig. 7.—Photograph of patient six months after operation.

This patient has entirely recovered and now makes her livelihood as a seamstress (Fig. 7). The vision in her left eye with minus 1.00 sphere is 20/15.

The eye that was removed was sent to the Army Medical Museum, Washington, D. C., and the following report of Dr. Elbert DeCoursey was sent to me by Lieut. Col. J. E. Ash:

Gross.—The cornea is clear and the pupil slightly dilated. There is some thinning of the sclera at the equator and thickening of the sclera posteriorly. The vitreous is cloudy. The retina is thickened posteriorly.

Microscopic.—The cornea, iris, ciliary body, and lens show little change except for slight posterior synechia and slight pigmentation of the filtrated meshwork of the anterior chamber. The optic nerve is the seat of a tremendous inflammatory cell infiltration with resulting necrosis. There is septic thrombosis of the central vein which extends into some tributaries. The nerve head is swollen and there is perineural fibrinous exudate in the external plexiform layer and subretinal albuminous and serous exudate. Round cells infiltrate the posterior portion of the choroid. Leucocytes extend from the optic nerve for a moderate distance into the retina. Away from the nerve head there are some small areas of albuminous exudate in the retina. Gram positive cocci are demonstrated in the optic nerve. A special cross section through the optic nerve at the edge of the bulb shows thrombosis of the artery as well as the vein. The meninges are also heavily infiltrated with leucocytes and show areas of necrosis.

Diagnosis.—Optic neuritis, staphylococcus aureus, secondary to cavernous sinus thrombosis.

I wish to express my appreciation to Drs. H. G. Ashburn and W. B. Martin for giving me the opportunity to present this case.

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816 Medical Arts Building.

XUM

GASTROSCHISIS

With Case Report*

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Gastroschisis is a term derived from the Greek words meaning "belly-cleft". It is used to describe a congenital malformation in which the abdomen remains open. In other words, in true gastroschisis there is an absence of the continuity of tissue in the abdominal wall, which permits direct communication between the abdominal cavity and the outside. This is not to be confused with the congenital malformation of umbilical or ventral hernia, in which the abdominal viscera may be lying outside of the abdominal cavity but are contained within a peritoneal sac. Both conditions have been referred to in the literature as "eventration", but there is a distinct and important difference between the two, in that, in gastroschisis there is not only the physical defect with its attending difficulties, but also the exposure and contamination of the peritoneal cavity with the chance of almost inevitable acute peritonitis. Gastroschisis has been subdivided into several other localizing terms to indicate the area of the abdomen in which it occurs, but, suffice it to say here, the defect may occur in any area of the abdomen, from the xiphoid process to the symphysis pubis but usually near the midline.

As far back as 1547 a case of eventration was reported in the literature, but this turned out to be a ventral hernia with the viscera covered by a peritoneal sac. There were two cases reported in 1878, both from England. Ogle[1] reported the case of a premature male infant (eight months) born with a congenital defect in its abdominal wall through which the stomach, duodenum and all of the intestines were protruding and lying outside of the peritoneum. This child lived only a few hours after birth. The second case in 1878 was reported by William Fear[2]. This was a full-term female baby who had a fissure in the abdominal wall about one and one-half inches long near the "abdominal ring". There was eventration of the pyloric end of the stomach, the small and large bowel. In this case the organs were replaced in the abdominal cavity; the wound was closed by "pulling upward on the umbilical cord making a cone shaped section in the abdominal wall which was then encircled around its base with a skein of cord", including a small area of skin, and tied tightly. The wound healed and the child survived with no difficulties. Incidently, this was the only case I found reported in the literature which lived, although there are probably others which have not been reported.

Others cases of gastroschisis are reported by Wolfe[3], Hedblom[4], Pribram[5], and Polayes[6], but these cases were all accompanied by other abnormalities, and are not of interest for this reason.

Three more recent cases are reported which are very similar to our case. One case, reported by Hyde,[10] was that of a full-term female baby. It was normal in all respects except for eventration of stomach, small and large bowels and urinary bladder. The abdominal opening extended from one inch below xiphoid process to symphysis pubis. This child lived only sixteen hours, and apparently no attempt was made to repair the defect.

Dry[7] describes the case of a female infant which weighed six pounds, fifteen and three-fourth ounces, and was normal in every respect except for gastroschisis. There was eventration of the liver, stomach, small and large intestines, through an opening in the abdominal wall which measured 10 cm. x 6 cm. The umbilical cord was inserted laterally to the left portion of the abdominal opening in the fetus. A surgical procedure was done; the organs were placed in the abdominal cavity and the wound was closed but the infant died the same day. The third case was that of Bernstein,[8] who reported that the infant weighed five pounds at birth and cried lustily without resuscitation. It appeared normal in all respects except that there was a circular defect one inch in diameter about one inch to the left of the umbilicus. Through this opening there protruded a cluster of bowel loops, which were cyanotic and matted inseparably by transudative adhesions into a firm mass. The stomach, the small and large intestines, the mesentery and a portion of the liver were in this mass. A cuff of peritoneum emerged from the opening but there was no sac present. Al-

*Read before the Augusta County Medical Association, May 6, 1942.

though the mass was not constricted, all feedings were vomited. The stomach was dilated and meconium was passed by rectum. The condition was treated by applying hot wet boric acid dressings to the externalized viscera, and feedings by mouth. After twelve hours a long midline incision was made in the abdominal wall and an attempt was made to place the viscera in the abdominal cavity. It was unsuccessful, however, due to the fact that the abdominal cavity was smaller than the viscera that had to go into it, and the patient died.

Fourteen other cases are cited by Murphy[9] in his statistics on 1,476 cases of "Congenital Malformations", but these were compiled from death certificates and no details are given.

The surgical treatment of gastroschisis has been generally unsuccessful, first, because of the disproportion that exists between the size of the eventrated viscera and the small, relatively empty abdominal cavity. The viscera in these cases lie free in the amniotic sac and grow more rapidly because of not being confined to the small abdominal cavity. The abdominal cavity, on the other hand, being relatively empty becomes abnormally small. Secondly, the viscera are generally found to be thickened and leathery, cyanotic and injected, with adhesions matting the loops into clusters, which would naturally interfere with the normal function of the intestinal tract. Thirdly, if the child lives long enough, it is confronted with the prospect of peritonitis from the contaminated and traumatized viscera, to say nothing of the dehydration that results from vomiting, distention and fever. The prospects are indeed gloomy for any infant born with this unfortunate condition. With this dark background, we humbly submit the following report of a case of gastroschisis which was repaired and is thriving after five weeks.

CASE REPORT

Baby M., male, weight five pounds, fourteen and one-half ounces, was delivered by Dr. A. M. McLaughlin at the Waynesboro Community Hospital at 8:20 A. M. on March 30, 1942. The mother's course of pregnancy had been uneventful, except that she took thyroid ext. gr. ½ t. i. d. all during pregnancy because of a mild hypothyroidism and the fact that she had had a spontaneous abortion once before. She started in labor two weeks ahead of schedule. There was no dystocia; in fact, she was in labor only about four hours. As the baby was brought across the mother's perineum, it was noticed that there was a large reddened mass hanging from its abdomen, and it was swinging across the perineum and swabbing the mother's anal region freely. The baby cried promptly upon delivery and appeared to be normal in every respect except for the viscera hanging from its abdomen. It appeared at first as though the baby's abdomen had ruptured and eviscerated in the course of delivery. Upon closer inspection, however, it was found that there was a slit about one inch long, just to the left of the base of the umbilical cord. There was no torn peritoneum or evidence of a sac. The edges of the opening were smooth and thickened. The viscera which extended through this opening were the small and large bowel, both of which were thick and leathery, cyanotic and larger than normal. The small bowel was convoluted in a cluster, inseparable with transudative adhesions. A Meckel's diverticulum with a broad base was seen on the ileum, and a short, thick appendix projected from the cecum.

It was readily seen that it was impossible to place this mass into the abdominal cavity through the opening already there. We enlarged the opening, therefore, to about two inches in the midline, when the child was only thirty minutes old, and the viscera were placed in the abdominal cavity with some difficulty because of their size. About 1.5 gm. of sulfanilamide crystals were then sprinkled into the peritoneal cavity and the wound was closed with interrupted, through and through sutures. The umbilical cord itself was not disturbed but was tied off as in a normal case. The child's general condition remained good throughout the procedure, although its abdomen appeared rather tight. It was then placed in an incubator with instructions to give it Ringer's solution one ounce every two hours. It was put to breast after twelve hours but refused to nurse. It vomited after each feeding of Ringer's solution and had two meconium stools. Urinated scantily.

Second Day. Lost one and one-half ounce, beginning to appear dehydrated. Vomiting almost all of everything given by mouth. 175 c.c. normal saline given by hypodermoclysis.

Third Day. Weight the same. Still vomiting. Given nothing by mouth. 250 c.c. normal saline by hypodermoclysis.

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Fourth Day. Started on small doses of atropine and mother's milk again. Vomiting continued. Urine showed no acetone, but 2 + albumen. Temp., 103.4°. 250 c.c. of normal saline by hypodermoclysis.

Fifth Day. Weight five pounds, twelve ounces. Still vomiting. Given nothing by mouth today. Temperature normal. 200 c.c. normal saline by hypodermoclysis.

Sixth Day. Weight five pounds, fourteen ounces (one-half ounce less than birth weight). Temperature, normal. Still vomiting. Started on prostigmine—1:4000—¼ c.c. every four hours, and lactic acid milk ½ ounce every two hours. Had two stools and retained most of feedings. No hypodermoclysis today.

After the sixth day, prostigmine was gradually decreased and lactic acid milk feedings continued, and baby retained the majority of feedings. An attempt was made to give it mother's milk again, but it vomited every feeding. It was therefore returned to lactic acid milk and gradually the feedings were increased, at longer intervals, until the sixteenth day when baby was discharged from the hospital. At time of discharge, it was retaining feedings on a schedule of two to three ounces every three hours, bowels were moving normally and wound had healed by first intention.

When last seen at the age of one month, it had gained a pound in the last two weeks and was apparently normal except for some bulging of the umbilicus, and the abdomen still has a tight distended appearance.

COMMENTS

The successful treatment of this case of gastroschisis has been attributed to the fact that, first, there was less disproportion than usual between the eventrated viscera and the abdominal cavity; second, the dehydration was combated early and frequently by the use of normal saline subcutaneously; third, the use of prostigmine seemed to help stimulate peristalsis in the bowel, after which the baby began to retain feedings for the first time; fourth, the repair of the abnormality was done early before symptoms of shock and systemic effects had taken place, and, lastly, because sulfanilamide was used in the abdominal cavity to lessen the degree of peritonitis, as evidenced by the absence of any wound infection.

SUMMARY

1. Gastroschisis is defined and differentiated from umbilical or ventral herniae.

2. A brief review of the literature.

3. The reasons for unsuccessful surgical treatment of this condition are pointed out.

4. Report of case treated successfully by surgery and comments thereon.

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RADIO IN PUBLIC HEALTH EDUCATION

DALE GROOM*,
Richmond, Virginia.

It is a singular fact that when the subject of medicine in radio broadcasting is mentioned to the average person, he thinks first of Carter's Little Liver pills, Tums, Lydia E. Pinkham, Father John, B. C.'s, Ex-Lax and Alka Seltzer. Nostrums and quacks like the late notorious Dr. Brinkley, as well as scores of chiropractors, have been on the air so consistently and for so many years, that they are almost as familiar as the NBC chimes. And it is no wonder that these nostrums and quacks do signify the medical profession to several million listeners.

Why is this so? Simply because, as one radio executive put it, "doctors are afraid they'll be accused

*The author is a member of the Senior Medical Class at Medical College of Virginia. He has completed six years in radio broadcasting-announcing, writing and production.

of violating a 2,000 year-old myth about lowering the integrity of the medical profession by going on the air. Unfortunately for the sick people, the quack doctors *do* use radio." And so do the patent medicines, together with the other exploiters whose influence has only been widened by radio, the most powerful and far reaching tool for moulding public opinion since Gutenberg's invention of movable types in the 15th century.

What is being done about it?

From the standpoint of the broadcasters, authoritative medical information, like all constructive, educational material, has always been welcomed to the air waves. The only requisite is that it be interesting and effectively presented for the listeners. Under the American system of broadcasting, all radio stations are licensed to operate "in the public interest, convenience and necessity". Proof that this pledge has been heeded must be submitted to the Federal Communications Commission by each station as its license comes up for renewal every year. It is toward this end of serving public interest that the broadcaster offers time on the air *free* to legitimate organizations for educational programs. The nostrums and quacks pay full commercial rates.

Only since 1935 has any extensive action been taken by the medical profession. The American Medical Association took up radio's free offer and cooperated with the National Broadcasting Company in presenting several regular series of programs directed toward public health education. This cooperation between an organized medical association and the broadcasting industry has progressively grown to include programs heard on NBC, Columbia, and the Blue nation-wide networks: "Your Health", "Medicine in the News", "American Medical Association Calling", and the current series, "Doctors at Work," now in its second year. Public school systems throughout the country have accepted the invitation to use some of these specially designed programs for hygiene classes in the schoolroom where the class tunes in weekly for lessons in dramatized form. Undoubtedly the A.M.A. programs represent the greatest advance in this field and have been acclaimed by station managers as exemplary of educational radio that *works*.

Less conspicuous but increasingly widespread have been the activities of many city, county and state medical societies through their local radio stations, notable among which have been Massachusetts and New York. Working on a smaller scale, these organizations use simpler forms of presentation: talks, interviews, question-and-answer programs. One of the first scientific surveys of *results* was made by the Public Relations Bureau of the Medical Society of the State of New York in 1940 by means of a questionnaire sent to station managers. Practically every state was represented in the 376 replies. On the listener value of one of the society's representative broadcasts, eighty-two judged it high, 142 medium, and forty-nine low. The broadcasters answered an emphatic "No" to the question, "would the president of the local medical society attract listeners regardless of his ability as a speaker?" Further conclusions were that medical speakers generally are interesting to a substantial portion of the radio audience; that it is the material rather than the speaker that makes the audience, and that the same material presented in a way to satisfy professional radio dramatic values would kindle a considerably wider listener interest. It was pointed out that "dramatic values" do not necessarily entail experienced actors, sound effects and complicated production routine, but rather the extraction of simple dramatic and human interest values inherent in any subject by careful preparation of the script, even by a single speaker.

From a practical standpoint, the errors of local medical societies venturing into radio have been those of most radio speakers. In the first place, they fail to realize the essential differences between public speaking and the more intimate style of the microphone directed at the individual in his home. They are apt to "address the radio public" instead of making a bid for the listeners' interest. Many speakers unconsciously assume that the audience is there and will stay there; then read from poorly adapted scripts—often in a stilted or expressionless manner—and take it for granted that by some process of "wireless osmosis" the subject will get across. Doctors too frequently obscure their information with technical camouflage, giving Mr. Average Listener the impression that their talks are directed not to him but to other doctors.

What can the local medical group, composed of busy physicians inexperienced in broadcasting, do to effectively use radio as an instrument of public health education? They can employ the fundamental principles of presentation which they themselves, as listeners, demand of others: a sincere, yet

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informal microphone manner, an arresting opening and sustained interest, short sentences of colorful and descriptive words wherever possible. If technical terms are used they should be defined. Statistics can be humanized and analogies can illustrate much information that the casual ear would miss. Straight talks, interviews, or if good talent is available through the local theater guild, dramatizations may be employed with only a moderate expenditure of time. The programs are best arranged in a regular series (at least once a week), linked with a certain degree of continuity, each dealing with one main point. And to put that point across it may be well to follow this old formula for a good sermon, "Tell 'em what you're going to tell 'em; tell it to 'em; then tell 'em that you told 'em".

It is a well proven fact that practically every radio station in the country will cooperate enthusiastically in planning, producing and publicizing such an educational project. Can the medical profession, now placing an increased emphasis on preventive medicine and conservation of health for our war effort, afford to underestimate this opportunity?

Results already have demonstrated that the recognized medical society *can* use radio for public health education—and do it effectively, ethically.

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EDITOR'S NOTE: Since this article was written the A.M.A. announced (*J.A.M.A.,* November 21, 1942) that "American Medical Association dramatized radio broadcasts in cooperation with the National Broadcasting Company will be resumed Saturday, December 26, at 5:00 P. M. EWT. The title of the new series will be 'Doctors at War: Book III of Doctors at Work' . . . Time is donated and production costs are shared by the National Broadcasting Company."

VENEREAL DISEASE IN SELECTIVE SERVICE REJECTEES

MASON ROMAINE, M.D.,
Health Officer City of Petersburg
and
W. E. CHAPIN, M.D.,
Venereal Disease Control Camp Lee Area
Petersburg, Virginia.

Man power is under demand by both Army and Naval authorities, putting an unusual demand on civilian life. It would seem advisable then, from an epidemiological as well as from a public health standpoint, to study men rejected as unsuitable for these services. As a brief start on a larger problem, we have gone over all selective service rejections for venereal disease in this community up to October 1, 1942.

Petersburg is a city of 32,076 population, 18,320 of whom are white and 13,756 colored. We have no record of the exact number of either race called up, but the population figure will give a fair relative estimate of the proportion of each examined. All are from 20-45 years of age and all are from Petersburg, except a few referred to us from examining boards nearby, principally the Health Departments of Chesterfield, Prince George and Dinwiddie Counties.

Four white men were rejected on account of venereal disease, three having had treatment previously for syphilis. Of the four, two are congenital, one late latent, one unclassified syphilis.

Two hundred and twenty-one colored men were rejected for venereal disease during the same period.

NUMBER MEN INVOLVED	
Syphilis and Chancroid	1
Gonorrhea	12
Syphilis and Gonorrhea	20
Syphilis	188

INFECTIONS	
Chancroid	1
Gonorrhea	32
Syphilis	209

CLASSIFICATION OF SYPHILIS	
Primary and Secondary	28
Early Latent	45
Late Latent	87
Cardio-vascular C.N.S. and ocular	12
Congenital	5
Unclassified	32

The clinical classification of these men has been entirely dependent upon one of us (M.R.) assisted

by Capt. W. M. Bowman now in the Army Medical Corps. The rather large number unclassified does not mean they were not studied. Some are under treatment at other places and their diagnosis cannot be verified. Others have a positive Wassermann reaction, but no clinical verification of disease. Despite a very excellent nursing staff, some have been lost or delinquent before classification.

Such a complete follow-up of a class of infected men is only possible with the cooperation of all the community authorities involved. The local Selective Service Board has been extremely cooperative to the extent of their power, delegating to the Health Department the right to summon men for a verification of the preliminary blanket serological tests.

The local physicians have seconded our efforts consistently and are carrying a large share of the treatment of these patients. Without their cooperation we would not be able to follow the patients at all.

The local police authorities as a court of last appeal give the necessary backing. Whereas it is seldom necessary to call on them to serve warrants for breach of quarantine, yet their consistent and wholehearted support lends strength to the program. The occasional jolting of the recalcitrant member of society strengthens the well doing of the remaining ones.

And over all, the State Health Department, with its central supervision for the whole community, develops a broad outlook, whereby a man can move practically wherever he wishes and still efforts reach out after him to prevent the spread of communicable disease.

CURRENT INFORMATION ON SYPHILIS

Sponsored by
THE COMMITTEE ON SYPHILIS CONTROL
MEDICAL SOCIETY OF VIRGINIA

Biologic Basis for the Management of Neurosyphilis*

Infection in syphilis occurs usually through direct or indirect contact with moist surfaces, the mouth or genitalia of a recently infected individual. Following infection a dissemination of the virus occurs within a period of hours. Spirochetes have been demonstrated in the regional nodes of animals in twenty-four hours. While the generalized spread of organisms is taking place, there is a multiplication at the inoculated site where, in an average of three weeks, the chancre appears. The chancre and its satellite bubo last a few weeks, healing spontaneously. Since the blood is not a suitable medium for the Spirochaeta pallida, an environment is sought in the tissues. These lesions, in an interval of approximately six weeks following the chancre, culminate in the secondary outbreak characterized by large numbers of organisms and little or no destruction of tissue, so that, after a period of days or months, if uninfluenced by treatment, spontaneous healing with little or no scarring results.

Following the secondary outbreak with healing, a series of recurring lesions containing spirochetes appear. These relapsing lesions occur in all tissues.

The patient may then enter upon a period of indeterminate length of latency averaging approximately seven years, showing no outward sign of syphilitic infection and recognizable, if at all, only by serology tests.

During this period of apparent latency and following the dissemination of organisms, there is occurring an invasion of the perivascular lymphatics, followed by a vascular reaction assuming the form of endothelial swelling with proliferation and the development of an obliterative endarteritis. This is accompanied by perivascular infiltration with lymphocytes, the appearance of plasma cells, fibroblastic proliferation and healing. Two phenomena are taking place: 1. slowly progressing inflammation terminating in fibrosis and causing physiologic breakdown from vascular occlusion and fibrosis, or 2. an inflammatory reaction with tissue destruction but relatively few organisms and termination in the allergic reaction of tertiarism.

The pathologic lesions in all stages are identical, the difference being largely one of degree. The stim-

*With the permission of the author (Dr. J. Earle Moore) and the publishers (C. C. Thomas, Springfield, Ill.) free use has been made of "The Modern Treatment of Syphilis".

ulus provoking the reaction may be trauma. In most cases, however, there is no known reason why a patient develops lesions of one or the other types or locations.

With the tissue invasion of the organisms there is developed an alteration in the reaction of the host to the virus. After fifteen days from the time of infection, reinoculation is not possible and this resistance to reinfection persists during the lifetime of an individual unless altered by treatments given early in the infection. After completion of the secondary period in man, an immune relationship is established and not altered by further treatment. It has been suggested also that some degree of immunity persists even after complete eradication of the infection.

In the interaction between host and parasite there is apparently developed a relationship of balance between host and parasite whereby the parasite may remain viable, causing little tissue reaction or increase in number until the balance is disturbed and new inflammatory reactions are set up. The present feeling is that the existence of the infection now has altered the individual so that the virus in the syphilitic acts differently from that in a normal person. The character of the lesion is now changed so that the destructive and proliferative changes with relatively few Spirochaeta pallida are in the ascendency. There is then developed in the syphilitic individual an alteration in the tissue which may manifest itself by overactivity or "allergy", or of indifference or "anergy"—both of these states continually undergoing alteration and interchange.

In untreated cases of syphilis approximately 25% of all infected are of the allergic type, developing gummatous late lesions and relatively free from degenerative sequelae; 25% develop chronic inflammation and fibrosis involving chiefly the cardiovascular and nervous systems; 25% have tissue damage so slight that they develop no physiologic disturbance and remain in prolonged latency; 25% attain a degree of resistance resulting in sterilization and spontaneous cure. There is considerable overlapping and change between these groups. Furthermore, different body tissues respond to infection in various degrees and interact with each other. It is true that those developing gummatous late lesions rarely develop neuro-syphilis, while the converse is true in individuals with late lesions characterized by fibrosis.

Clinical observations also indicate that in some patients the body's own defense mechanism may deal successfully with invasion of the nervous system. It is assumed that the neuraxis is invaded by the Spirochaeta pallida in every patient at the time of the general dissemination of organisms. Only 25% of untreated individuals develop, however, clinical evidence of central nervous system involvement. In an additional 12-15% abnormalities are found in the spinal fluid with no clinical evidence of neurosyphilis existing. Of the remainder, 17% of patients with late syphilis but normal spinal fluids show suggestive neurologic abnormalities and it is probable that the body's defense mechanism has cared for them.

Treatment exerts a disturbance on either or both the response of the host to organisms freshly introduced from without or to the host's own parasites. Man may be rendered susceptible to reinfection by treatment but only if it is begun early—usually before the third month; after this time the refractory state is apparently not altered.

Treatment may depress or interrupt the process of formation of gradually developing immunity so that, while being resistant to organisms from without, one still has inadequate defense to the Spirochaeta pallida from within. Under these circumstances, a fresh multiplication and dissemination of organisms may occur and be manifested by relapse—usually seen as mucosal or cutaneous secondaries, neurorecurrence or ocular relapse.

This interference is limited to early syphilis and probably within the first year but extending as long as four years, after which it is no longer possible to alter the patient's defense mechanism either by organisms from within or without. Therefore, early syphilis must be treated continuously until complete sterilization is reached, but in late syphilis this is not so essential and an intermittent type of therapy may be used.

With relation then to neurosyphilis, invasion of the nervous system occurs probably in all patients and, unless the course of the disease is influenced by treatment, this takes place in most instances within the first year after infection. In spite of this constancy of invasion, relatively few individuals later develop actual tissue involvement manifested by obvious clinical signs of neurosyphilis, the proportion being markedly influenced by various factors particularly sex and race.

With these factors in mind, the classification of the various types of neurosyphilis both on a clinical and an anatomic basis may be divided into four groups: —

1. Predominantly meningeal neurospyhilis occurring early, usually within the first two years after infection and including syphilitic meningitis, most of the neuro-recurrences and early asymptomatic neurosyphilis.

2. Predominant vascular neurosyphilis which may occur early but is usually a late manifestation. This depends on an endarteritis and may be associated with meningeal or parenchymatous involvement. It causes cerebral vascular accidents.

3. Predominant diffuse meningo-vascular neurosyphilis in which parenchymal changes may or may not be present. This includes brain gumma, syphilitic epilepsy, diffuse cerebrospinal syphilis and late asymptomatic neurosyphilis.

4. Predominant parenchymatous neurosyphilis, including paresis, tabes and primary optic atrophy.

The pathologic changes in paresis vary widely; grossly the brain is covered by thickened and opaque meninges, the dura being altered less than the pia and arachnoid. Adhesions between them and the dura as well as between the pia and cortex are common. The pathologic essentials include a diffuse inflammatory reaction in the cerebrum, a chronic spirochetal encephalitis localizing about the vessels and meninges with coat sleeve lymphocytic and plasma cell infiltration about the capillaries, and a degeneration of the parenchyma with compensatory gliosis. There is a variation in the relative proportions so that in some instances extreme atrophy and little inflammatory change is apparent; in others the vascular picture and plasma cell infiltrations are predominant. Spirochaeta pallida may or may not be demonstrable but are always present.

In the predominantly meningeal and vascular groups of the classes mentioned above, the inflammatory element predominates; in the parenchymatous, the degenerative. For this reason treatment is more successful in the former groups in proportion to the extent that inflammation predominates over degeneration.

The physician who undertakes the treatment of any manifestation of syphilis should have a clear understanding of what happens to an individual who acquires the disease, and in addition the total effects (beneficial and harmful) of the remedial agents on the person. This specific infectious disease can be cured in most cases in that the Spirochaeta pallida is destroyed. This is easier in the earlier stages of the infection. The scars and parenchymatous destruction cannot be corrected in most instances. It should be emphasized that the old idea of quaternary syphilis has been abandoned. The progression of syphilitic inflammatory processes depends on the presence of the organism. It is true that as as result of partial or complete vascular occlusion and shrinking of replacement fibrous tissue cells, there may be some increase in symptomatology for a period after the eradication of the infectious agent.

In clinical practice it is impossible to determine for sure without therapeutic trial how much of the symptomatology in late syphilis is due to temporary dysfunction from the inflammatory processes or from definite degeneration and scar formation. A case of neurosyphilis with both clinical and laboratory findings of paresis may have a subacute or chronic encephalitis without much cortical degeneration as the basis for the clinical picture. In this case where the inflammatory reaction, edema, perivascular infiltration and so forth predominate, specific therapy gives excellent results. There is no case of untreated neurosyphilis which is free from some inflammatory reaction even after degenerative processes occur predominantly. In other words, without treatment to the point of cure, there is no such condition as "burned out syphilis".

The management of neurosyphilis consists of first, correction of associated abnormalities; second, improving patient's nutritional state; third, specific chemotherapy (arsenicals, bismuth, mercury and iodides); and fourth, additional theraputic procedures like fever, tryparsamide, etc. *It should be emphasized that specific chemotherapy is the most important item in regular treatment.* The accessory and additional measures like malaria and intraspinal treatment should not replace general therapy. It should be remembered that these patients have general syphilis as well as neurological involvement. Selection of specific drugs, special procedures and general management must be individualized. The plan or scheme of therapy will vary with the findings in each case.

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MENTAL HYGIENE ACTIVITIES

Alcoholism a Medical Problem.

Governor Colgate W. Darden, in a recent statement to the press, has expressed his hearty approval of the plan to provide separate care and treatment facilities for inebriates—and made some timely suggestions regarding the establishment of such an institution. The Governor also announced that he has asked the Department of Corrections to give him all the data available as to the number of inebriates committed to the jails during the past year, as represented in the total of more than 100,000 of all commitments during this period, laying special emphasis on the number of times any given individual may have been committed in this period.

The State Hospital Board has expressed its pleasure and has thanked the Governor most heartily for his interest as it will aid greatly in the effort of the Board to satisfactorily and speedily work out a plan whereby this ever-growing problem can be taken care of in a practical as well as scientific manner.

The Board is emphasizing the importance of considering this as a medical and health problem, as it seriously affects every community in the State. Therefore, for a successful and effective program, a cooperative and sympathetic attitude is essential among the physicians of the State, as well as social agencies and law-enforcement officials.

The State Hospital Board adopted the following resolution, which had been under consideration for sometime, in its meeting on November 24. A copy was presented to the Governor by the Board's Chairman, Senator Morton G. Goode; Dr. H. C. Henry, Commissioner; Dr. R. A. Morison, Board Member who sponsored the resolution; Mr. George P. Coleman, Board Member; and F. W. Gwaltney, Executive Secretary. The Governor received this resolution enthusiastically and later gave it to the press. This resolution should at least form the basis for future action in this very important matter.

WHEREAS, The State Hospital Board is authorized by statute to supervise, direct, and control matters pertaining to the care, treatment, and prevention of mental disease, mental deficiency, epilepsy, and inebriacy; and

WHEREAS, For the proper institutional care and treatment of any of these groups, adequate segregation and classification of the various types is necessary; and

WHEREAS, For many years the State Hospital Board, hospital administrators, city and county officials, welfare authorities, and many others have been concerned about the ever growing problem of the inebriate; and

WHEREAS, The State Hospital Board is especially concerned because of the statute which was adopted in 1916, requiring the State Hospitals to receive "any person who through use of alcoholic liquors or habit-forming drugs, has become dangerous to the public or himself, and unable to care for himself or his property or family, and for either of these reasons has become a burden on the public"; and

WHEREAS, Because of this requirement approximately 8,000 persons have been admitted as inebriates to the State Hospitals since the adoption of the law; and

WHEREAS, The number of such admissions has been increasing at an alarming rate until it has reached approximately 25 per cent of the total of all admissions to the four State Hospitals; and

WHEREAS, In the year which closed on June 30, 1942, of 2,764 admissions to the four hospitals, 667 or 24.1 per cent were admitted because of a frank alcoholic psychosis or as an inebriate. Approximately another 200 of the admissions on their own statement were intemperate or heavy drinkers, making alcohol the direct or contributing factor in 30 per cent of all admissions; and

WHEREAS, Since the Western State Hospital has been designated by the State Hospital Board to receive inebriates from the whole State when admitted as such; and

WHEREAS, Because of this designation, large numbers of inebriates are constantly going in and out of this hospital, which movement overshadows, dominates, and seriously interferes with the effort to care for and treat the more than 2,200 insane patients in this institution; and

WHEREAS, After many years of experience in the present method of handling the inebriate in the State Hospitals, it is the firm conviction of the State Hospital Board that the State should endeavor to find a more satisfactory solution to this problem, and that the care and treatment of the insane should no longer be confused or hindered by the ever growing traffic of alcoholics in and out of the mental institutions; and

WHEREAS, Since the statute of 1916 requires that the superintendents of State Hospitals recieve and keep inebriates until the superintendent of the institution shall declare such person cured and restored to his normal condition, and since because of limitations in space, personnel, and treatment facilities, this has never been possible.

BE IT RESOLVED, *First*, That the State Hospital Board go on record as favoring the establishment, as early as conditions will permit, of a separate institution for the care and treatment of the inebriates.

BE IT RESOLVED, *Second*, That all work, care and treatment be under psychiatric direction with an ade-

quate staff of medical assistants, nurses, attendants, occupational and industrial therapists, and others; that full advantage be taken of the latest methods of treatment; such as, psychotherapy, occupational and industrial therapy, re-education, etc.

BE IT RESOLVED, *Third*, That the proposed institution organize and conduct a program of study and research, where in cooperation with other like projects both within and without the State, the whole problem of alcoholism, its prevention, treatment, and cure, may be studied scientifically and possible solutions found and given to the public for their use and guidance.

BE IT RESOLVED, *Fourth*, That the Chairman of the State Hospital Board be authorized to appoint a committee or to designate the whole membership of the Board to present this resolution to Hon. Colgate W. Darden, Jr., Governor of Virginia, and invite him to sponsor this project and present it to his advisory council and then to the General Assembly which meets in January, 1944.

BE IT RESOLVED, *Fifth*, Because of the preventive, control, economic, social, medical and research aspects of this problem, doubtless, many interested persons and groups would like to aid the State Hospital Board in the promotion of this effort. The Commissioner of Mental Hygiene and Hospitals is therefore authorized to etxend an invitation to the Research Divisions of the Medical College of Virginia and the Medical School of the University of Virginia, the Medical Society of Virginia, the Mental Hygiene Society of Virginia, and the Neuropsychiatric Society of Virginia to assist the State Hospital Board in solving the inebriate problem.

Since the State Hospital Board has very definitely called upon medical authorities to assist or take the lead in the solution of this problem, doubtless the Medical Society of Virginia and the Mental Hygiene Society of Virginia will lend their full cooperation in any reasonable plan which may be offered.

CASE REPORT OF MATERNAL DEATH

MATERNAL HEALTH COMMITTEE
MEDICAL SOCIETY OF VIRGINIA

The patient was a twenty year old white woman, who had had one previous pregnancy. She was first seen by a physician on June 1, 1941, because of fever and abdominal pain. She gave a history of having missed three menstrual periods and stated that she had expelled some products of conception three to five days before the visit of the physician. A purulent vaginal discharge was present. She was given morphia gr. ¼ and sent to a hospital. She was admitted to a hospital shortly thereafter. Temperature 99.4, pulse 120, respirations 22. The physical findings were not recorded. On the following morning the temperature was 103.6 degrees and pulse 96. A dilatation and curettage was done on that day, June second, and some products of conception were removed, and a diagnosis of an "infected abortion" was made. The patient continued to run a septic course with vomiting and cyanosis. Blood count on June third, first postoperative day, showed hemoglobin 80 per cent, red blood count 3,820,000, and white blood count 18,200. On the fourth postoperative day a blood culture was positive for streptococcus and staphylococcus aureus. She was given prontosil, neoprontosil, intravenous glucose, and morphia. She died on the eighth hospital day. An autopsy was not performed.

COMMENT

This has been classified by the committee as a preventable obstetrical death. It would seem from the history and developments that this patient had an induced abortion, which of course would make the death preventable. In addition, no medical care was obtained until the patient was seriously ill. The treatment which was instituted after admission to the hospital is hardly in line with the present generally approved methods of management of infected abortions. The patient may have had septicemia and peritonitis at the time of admission, or in any event was obviously seriously infected. Under these circumstances it is usually better to treat the patient along conservative lines, rather than resort to a dilatation and curettage. Operative manipulations in the pelvis disturb the attempts of nature to limit the inflammatory process to the pelvis, and are frequently followed by a generalized spread of the infection. Small blood transfusions and intensive sulfonamide therapy, along with general hygienic measures and symptomatic therapy would have offered this individual a better chance for survival.

XUM

Miscellaneous

The Critical Antimalarial Problem and Its Solution

Dr. L. H. Weed, of the National Research Council, has requested that the attention of readers of the MONTHLY be called to the urgent necessity of conserving available supplies of quinine. Along with the vastly increased need for antimalarial drugs by our armed forces and those of our allies, the customary source of 90 per cent of the world's quinine supply has been cut off from us.

The War Production Board and National Research Council have worked out a program which it is believed will result in a sufficient supply of antimalarial drugs for the civilian population as well as for the armed forces of the United Nations.

Stocks of quinine and other cinchona alkaloids have been frozen and their use limited to treatment of malaria, except that quinine can be used in myotonia congenita and quinidine in cardiac disorders. Quinine cannot be used as local anesthetic or sclerosing agent nor in paralysis agitans, amyotrophic lateral sclerosis, myotonia atrophica, nor for the induction of labor.

"Totaquine", a mixture of alkaloids from South American cinchona bark, is recommended as substitute for quinine in treatment of malaria. This preparation contains not less than 7 per cent nor more than 12 per cent anhydrous quinine and a total of not less than 70 per cent nor more than 80 per cent of the anhydrous crystallizable alkaloids, such as quinidine, cinchonine, and cinchonidine. In dose of 10 grains 3 times daily, it is believed to equal quinine sulphate orally for treatment of malaria. It is hoped that the supply of Totaquine will be adequate.

Atabrine of proved chemical purity will be produced in adequate amounts in this country. Temporary gastro-intestinal disorders occur in a variable percentage of patients receiving Atabrine; investigations under way may disclose the cause and render possible its removal. Yellowish pigmentation of the skin, without impairment of liver function, may be produced; this disappears on cessation of medication. Atabrine is an effective antimalarial, both prophylactically and therapeutically; its action is slower than that of quinine, thus rendering it inferior for initial treatment of malaria but in certain other respects it is superior. It is very effective after 1 to 3 days preliminary treatment with quinine.

The following recommendations have been made:

1. COMBINED QAP TREATMENT. (Method of Choice.)
   (a) Totaquine (or quinine sulphate) 0.64 gram (10 grains) 3 times daily after meals 2 to 3 days or until pyrexia is trolled; then give
   (b) Atabrine, 0.1 gram (1½ grain) 3 times daily after meals 5 days. After 2 days *without antimalarial medication,* give
   (c) Plasmochin, 0.01 gram (3/20 grain) 3 times daily after meals for 5 days, except to debilitated patients, who should receive only *2 doses daily.* DISCONTINUE IF TOXIC SYMPTOMS OCCUR. NEVER GIVE PLASMOCHIN AND ATABRINE CONCURRENTLY.
2. ATABRINE-PLASMOCHIN TREATMENT. (For simple vivax infections or for other infections if Totaquine or quinine not available.)
   (a) Atabrine, as above, for 7 days. After *2 days without antimalarial* medication, give Plasmochin, 0.01 gram (3/20 grain) 3 times daily as above.
3. TOTAQUINE-PLASMOCHIN OR QUININE-PLASMOCHIN TREATMENT. (If Atabrine is not available.)
   (a) Totaquine or Quinine Sulphate as above for 7 days, during the last 5 of which accompany each dose of the cinchona product with Plasmochin, 0.01 gram (3/20 grain) 3 times daily.
4. SUPPRESSIVE (PROPHYLACTIC) TREATMENT.
   (a) Atabrine, 0.1 gram (1½ grain) twice daily after meals each week, allowing 2 to 3 day intervals between medication.

   In the present state of knowledge, Atabrine should be used only under supervision of a physician or public health officer.

Military Medicine

Virginia Doctors in Service Supplement 3.

This is the Third Supplement to the list of Virginia Doctors in Service, the original list appearing in the July, 1942, MONTHLY, with Supplements in September and October. Names are given alphabetically, with home addresses, in view of the constant changes in location and rank. Readers will render a service by sending nomes of any omissions that they may be published at a later date.

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Dr. Wm. Richard Smart, Norfolk.
Dr. H. Garnett Snead, Franklin.

XUM

Dr. Wilson P. Stephens, Standardsville.
Dr. Geo. Dennis Vaughan, Richmond.
Dr. John Tabb Walke, Richmond.
Dr. Geo. Brooks West, Norfolk.
Dr. Wm. L. Wingfield, Ashland.
Dr. Herman Wolff, Lynchburg.
Dr. Garland M. Wright, Bridgewater.

Public Health Statistics

I. C. RIGGIN, M. D.,
State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for November 1942, compared with the same month in 1941, and for the period of January through November 1942, compared with the same period in 1941, follows:

	Nov. 1942	Nov. 1941	Jan.-Nov. 1942	Jan.-Nov. 1941
Typhoid and Paratyphoid	15	47	236	315
Diarrhea and Dysentery	111	301	4,474	5,502
Measles	32	400	4,874	35,116
Scarlet Fever	318	310	1,471	1,467
Diphtheria	119	176	637	638
Poliomyelitis	3	30	42	147
Meningitis	14	4	156	96
Undulant Fever	3	3	32	15
Rocky Mountain Spotted Fever	2	1	47	32
Tularemia	1	2	34	27

STANDARDS FOR MATERNITY CARE OF WOMEN EMPLOYED IN INDUSTRY

Increased employment of women in industry, as a war measure, necessitates protecting the health of women workers who are pregnant and of those who recently have become mothers. The need of providing care for young infants also is recognized.

Recently, a well qualified group, including prominent obstetricians, pediatricians, industrial hygienists and representatives of labor and employers, after due consideration, issued a statement of standards for maternity care and employment of mothers in industry. These standards are intended to guide employers in providing for pregnant women and mothers in their employ such special consideration as is essential for their health. These standards, also may guide physicians in advising both patient and employer with regard to suitable provision to meet the health requirements of mothers engaged in industrial activities.

It is believed that the recommendations are well within the reasonable performance of all employers. It is known that some employers now are making suitable provisions in line with these suggestions.

The statement indicates that, although the labor situation in this country is acute because of the war, it does not require the recruitment or employment of pregnant women or women with young infants; moreover, that a woman who is expecting a child should give first consideration to her own health and to plans for safeguarding her infant's health. Nevertheless, some women who are pregnant or who have young children may find it necessary to work. The Committee also recognizes that in such cases provisions for maternity care should be made and leave of absence granted to protect the health of the mother without jeopardizing the mother's job.

The Committee realizes that conditions of pregnant women and the home duties performed outside of working hours vary widely, and, therefore, some individualization of arrangement is necessary. A few general recommendations, however, have been given as a guide.

It is recommended that the pregnant woman who works should have adequate prenatal care; that she should not work on a night shift nor more than eight hours a day or 48 hours a week at most; and that rest periods during working hours be compulsory. A minimum of six weeks leave of absence before delivery and eight weeks after delivery is advised. Employers should grant leave of absence readily on presentation of a statement from the attending physician if complications of pregnancy either before or after delivery arise.

Detailed recommendations are given with regard to the types of work in which pregnant women should not be employed. Occupations that involve heavy lifting or other heavy work or continuous standing or moving about are undesirable. Occupations requiring a good sense of bodily balance and occupations involving accident risks, such as operating a punch press, are too hazardous for pregnant women. Exposure to specified toxic substances (aniline, benzol, nitrobenzol, turpentine, etc.) is considered extra hazardous during pregnancy, and it is emphasized that pregnant women never should be employed in any workroom where these substances are used or produced.

Physicians in Virginia may be called upon for this type of advice more frequently in the future than heretofore. They have a real opportunity not only to guide the activities of pregnant women who may seek advice as individual patients but also may have an opportunity to impress upon employers the importance of proper provision for this type of employee.

Woman's Auxiliary to the Medical Society of Virginia

President—MRS. H. W. ROGERS, Norfolk.
President-Elect—MRS. W. CLYDE WEST, Alexandria.
Recording Secretary—MRS. C. C. SMITH, Norfolk.
Corresponding Secretary—MRS. ALBERT G. HORTON, Norfolk.
Treasurer—MRS. REUREN F. SIMMS, Richmond.
Chairman, Press and Publicity—MRS. C. E. ARNETTE, Alexandria.

Notice to Executive Committee Members.

By order of Mrs. H. W. Rogers of Norfolk, president, the Executive Committee of the Woman's Auxiliary to the Medical Society of Virginia will hold its winter meeting in the Richmond Academy of Medicine Building on January 27, at 1:30 p.m. All members are urged to be prompt in order to catch afternoon trains home.

The Norfolk Auxiliary.

Met on December 2 in the Library of the Medical Arts Building under the presidency of Mrs. W. E. Butler. Dr. A. Brownley Hodges, civilian defense chief of emergency medical service, gave a brief talk requesting the assistance of the Auxiliary members in organizing and distributing equipment for the casualty centers in Norfolk. Mrs. Millard Savage was made chairman of the committee to assist Dr. Hodges.

Mrs. Richard Reynolds gave an interesting résumé of the life of Jane Todd Crawford, the first woman to undergo a now familiar surgical operation.

The Auxiliary is sponsoring the sale of war bonds and stamps at Ames and Brownley's Department Store, every Monday, and to date stamps and bonds in the amount of $27,000 have been sold. The members also serve the sewing room at Red Cross headquarters every Friday, and as an additional wartime activity sponsor dances for service men at USO headquarters.

Three new members were taken into the Auxiliary at this meeting—Mrs. Ben Steingold, Mrs. M. L. Galbraith, and Mrs. Philip B. Parsons.

MRS. BROCK D. JONES, *Chairman,*
Press and Publicity.

Alexandria.

The December meeting of the Woman's Auxiliary to the Alexandria Medical Society was held at the "Laura Lee Candy House".

Mrs. Robert Hightower, Program Chairman, introduced the speaker, Mrs. Stanley King. who is Chairman of the Volunteer Special Service Committee of the Red Cross. She discussed the training, duties and requirements of the service group known as the "Gray Ladies".

Mrs. Harrison Picot, chairman of the committee, with Mrs. C. E. Arnette and Mrs. C. V. Amole, assisting, sold $25.00 in pansy plants. The proceeds will go to the buying of equipment for the Alexandria Hospital.

The Auxiliary donated the sum of $160.00 to the Alexandria Laboratory for purchasing a microtone.

A beautiful hand-made quilt was raffled off and $25.00 cleared.

Mrs. Charles Nicholson, Jr., was taken in as a new member.

Following the business meeting, an informal party was held by Mrs. W. Clyde West, hostess.

MRS. C. E. ARNETTE, *Chairman.*
State Press and Publicity.

Book Announcements

Books received for review are promptly acknowledged in this column. In most cases, reviews will be published shortly after the acknowledgment of receipt. However, we assume no obligation in return for the courtesy of those sending us same.

Mental Health in College. By CLEMENTS C. FRY, M.D., Lecturer in Psychiatry and Mental Hygiene and Psychiatrist to the Department of University Health, Yale University. With the Collaboration of EDNA G. ROSTOV, Research Assistant in Psychiatry and Mental Hygiene, Yale University. New York. The Commonwealth Fund. 1942. xix-365 pages. Cloth. Price $2.00.

Mental Illness: A Guide for the Family. By EDITH M. STERN. With the Collaboration of SAMUEL W. HAMILTON, M.D. New York. The Commonwealth Fund. 1942. xvii-134 pages. Cloth. Price $1.00.

Fractures. By PAUL B. MAGNUSON, M.D., F.A.C.S., Associate Professor of Surgery, Northwestern University Medical School; Attending Surgeon, Passavant Memorial Hospital and Wesley Memorial Hospital, Chicago. Philadelphia. J. B. Lippincott Company. 1942. 4th Edition Revised. xxii-511 pages. 317 Illustrations. Cloth. Price $5.50.

Proceedings of the Eighth American Scientific Congress. Held in Washington, May 10-18, 1940. Under the Auspices of The Government of the United States of America. Volume VI. Public Health and Medicine. Department of State, Washington. 1942. 496 pages.

Encephalitis. A Clinical Study. By JOSEPHINE B. NEAL, A.B., M.D., Sc.D., F.A.C.P., Associate Director, Bureau of Laboratories, Department of Health, New York; Clinical Professor of Neurology, College of Physicians and Surgeons, Columbia University. Grune & Stratton, New York. 1942. xviii-563 pages. Cloth.

Since the first publications of French authors and the well know monography of C. v. Economo (1917), a considerable number of papers have been published dealing with the various aspects of epidemic encephalitis. This book is a publication of the William J. Matheson Commission for Encephalitis Research. If, as the secretary of this commission points out in his foreword, the dietary deficiencies and privations of the present war may well furnish the soil for another epidemic, this publication would indeed be timely and welcome. It is a comprehensive whole of all the problems involved and will be of inestimable help for the general practitioner and the neurologist. The following subjects are discussed (after a general discussion): epidemiology, neurological complications following acute infections and vaccination, clinical course of epidemic encephalitis, treatment of epidemic encephalitis, surgical treatment of post-encephalitic symptoms, psychiatric sequelae of epidemic encephalitis, post-encephalitic behavior disorders in childhood and pathology of encephalitis. Special emphasis is laid on the various forms of encephalitis such as observed in various regions and at various periods. The whole subject is discussed on a very large scale, kindred conditions are included and the comparative pathology of encephalitis has not been neglected. Each chapter represents the personal view and experience of the various authors the names of which are sufficient guarantees of the value of their contributions.

W. RIESE.

Tales of the Tuckers. By BEVERLEY R. TUCKER, M.D., Richmond, Virginia. The Dietz Press, Richmond. 1942. 170 pages. Illustrated. Cloth. Price $5.00.

The well known specialist in neuro-psychiatry, Dr. Beverley Randolph Tucker of Richmond, Va., is the author of "Tales of the Tuckers", which is being highly commended to the reading public. Dr. Tucker is eminently fitted to be the author by reason of his heredity, environment and accomplishments in the literary field, for among other things, he has to his credit an historical novel, a book of poems, a play, a volume of essays on genius, and various medical treatises. For twenty-six years he was professor of nervous and mental diseases at the Medical College of Virginia, and has been for a number of years physician-in-chief of the Tucker Hospital.

"Tales of the Tuckers" is a happy choice for the title of this book for it is essentially a series of tales, many of which have been received by word of mouth. The volume is unusually attractive in format, the frontispiece being the ancient Tucker House at Williamsburg, and besides the family coat-of-arms, there are eighteen portraits of the Tucker clan. Though these are stories of departed Tuckers, they live and move and have their being in every page of the book, beginning with the illustrious progenitor, St. George Tucker of Bermuda-Virginia and coming down through the male line for five generations to the author. The table of contents is indeed illuminating as it reveals the amazing versatility which this family possessed. Not satisfied to follow one profession, a Tucker would choose several. No hum-drum, circumscribed existence for them. They walk the road of high adventure in that romantic, vanished era. In every war of American history the patriotism of the Tuckers is exemplified. Their contributions to the American way of life is not easily computed. If you enjoy true stories of thrilling adventure you will find it in "Tales of the Tuckers", especially in the colorful life of James Ellis Tucker.

It cannot be said that the Tuckers are a typical American family, for in health, intelligence, culture and achievements they are distinctive. Accord-

ing to Dr. Tucker's book, of the nineteen Tuckers whose age at death is known, the average life span was sixty-three years. They were remarkably free from such diseases as insanity, feeblemindedness, cancer, tuberculosis, serious alcoholism, heart or kidney disturbances, etc. Therefore this family makes interesting reading from the standpoint of its genetic and eugentic importance.

In "Tales of the Tuckers" charming, and sometimes astonishing anecdotes, woven of humor and pathos, reveal the fact that truth is often stranger than fiction. Did not the author's Uncle Jim outwit highway robbers, along with other daring exploits and hair-raising adventures, both in America and abroad? Dr. Tucker has a decided flair for research—Tuckerana in particular, and the reader enjoys his virile style in presenting his subject matter. "Tales of the Tuckers" is readable and entertaining as well as informative. Tucked away in a footnote the following unusual facts are found: Of the forty-nine Tuckers mentioned, eleven were attorneys-at-law, eight of whom became judges or professors of law or both; ten were physicians, five becoming heads of hospitals or professors of medicine or both; six were clergymen, three of them becoming bishops; three educators; six business executives; two chemists; three army officers; one farmer, and three who's occupation is unknown. Of the forty-nine mentioned in "Tales of the Tuckers", twelve have published books or been editors, four of whom were also poets. Many of them served in public office, one being Treasurer of the United States and four others served in the Congress of the United States.

MARY LOUISE GILLS.

Central Autonomic Regulations in Health and Disease. With Special Reference to Hypothalamus. By HEYMEN R. MILLER, M.D., Associate Attending Physician Montefiore Hospital, New York City. Introduction by JOHN F. FULTON, M.D., M.A., D.Phil., (Oxon) Sterling Professor of Physiology, Yale University. Grune and Stratton. New York. 1942. xx-430 pages. Illustrated. Cloth. Price $5.50.

This book is a discussion of the central non-voluntary regulation of temperature, water and mineral balance, metabolism, circulation, sleep, reproduction, and the emotions, as well as a brief résumé of the anatomy of the hypothalamus. The peripheral innervation of organs is not included to any extent. It represents an amazing amount of reading by the author, for the bibliography is extensive. As a reference book in this field, it can be recommended. As a book to read however, it is very trying. Something about the author's style makes it well-nigh impossible to read more than a few pages at a time. This may be because the facts are listed rather than digested.

There are some curious apparent errors in the text. On page 3, in describing the axon reflex, the author arbitrarily stops a nerve impulse in the middle of an axon and sends it back along another branch. On page 4, he states that Lewis involves the axon reflex to explain the response of skin vessels to histamine. He often speaks of "skeletal blood vessels" where he must mean "skeletal muscle vessels". He claims (p. 72) that epinephrine from the adrenals is a "chemical excitant of sympathetics." On page 138 he states "the intrinsic autonomic activity of the heart depends, however, upon a fine network of intracardia nerve fibrils and ganglia."

Another annoying characteristic in his inclusion of brief clinical case histories which have little apparent relation with the subject under discussion. For instance (p. 142), in discussing regulation of circulation, he describes a typical case of mitral disease and suddenly concludes that "the innervation and function of the pulmonary circulation are important factors in these and other examples of cardiac and pulmonary disease", but he neglects to point out how or why they are involved.

Since this book stresses clinical applications, one is surprised to find so little mention of the nature of cerebral lesions in clinical pathologic sleep; there being much on location of experimental lesions.

The increasing appreciation of the amazing effects of the mind on such apparently non-volitional processes as menstruation, urination, perspiration and digestion make this book a definite contribution for reference by the research-minded physician.

R. J. M.

XUM

VIRGINIA MEDICAL MONTHLY

Official Publication of the Medical Society of Virginia

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M. PIERCE RUCKER, M. D.,
Editor

AGNES V. EDWARDS
Business Manager

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Editorials

War and Medicine

IT was the privilege of the editor to attend the recent annual conference of Secretaries and Editors of State Medical Associations at the headquarters of the American Medical Association. Among the speakers were Col. Fred. W. Rankin, President of the A.M.A.; Admiral Ross T. McIntire, Surgeon-General of the United States Navy; Dr. Frank H. Lahey, Chairman of the Board of the Procurement and Assignment Service for physicians, Dentists, and Veterinarians; General C. C. Hillman, representing the office of the Surgeon-General of the U. S. Army; Dr. James E. Paullin, President-Elect of the American Medical Association; Surgeon-General Thomas Parran, of the U. S. Public Health Service; Col. L. G. Rowntree, Chief of the Medical Division of the Selective Service System; Dr. Creighton Barker, Secretary of the Connecticut State Medical Society; Dr. Walter F. Donaldson, Chairman of the War Participation Committee of the A. M. A.; and General David N. B. Grant, of the Air Corps. We were greatly impressed by the earnestness and sincerity of the speakers. Medicine has a great roll to play. Of no other group, call it profession, trade or trust, is so much expected; nor has any other group such a wonderful opportunity for service. Our impressions from this meeting will be discussed under four headings. 1. Organized Medicine must supply the Armed Forces with adequate medical care. 2. There is even greater need for research, albeit of a somewhat different kind. 3. We must maintain our high standards of medical education. 4. We must supply the medical needs of the civilian population.

The needs of the Army and Navy have been met so far as 1942 is concerned. All but thirteen States in the Union have supplied more than their quota as of October 31, 1942. The percentages vary from 76 for Connecticut to 224 for New Mexico. Virginia supplied 138 per cent of her quota. What the needs for 1943 are, is not known at present. The Navy and the Air Forces will need 6.5 doctors per 1,000 men. The Army has

not as yet made known its needs. It is interesting in this connection to note, according to Gen. Parran, that the British had 3.5 doctors per 1,000 soldiers. In the first World War Germany had 3 doctors per 1,000. It is likely she has fewer in the present conflict. Admiral McIntire was enthusiastic about the Reserve Medical Officers. They are doing practically all the medicine and surgery in the Navy. The results they get in the treatment of the wounded are almost unbelievable, less than 1 per cent mortality. He mentioned particularly the prompt anti-shock treatment—morphine and plasma—on the battlefield, and the rapid transportation by plane to the base hospital as important factors in the results.

Research must go on, but probably along somewhat different lines. As an example, Admiral McIntire mentioned the effect of concussion of depth charges upon persons swimming or floating in the water. When a vessel carrying depth charges is sunk, the depth bombs go off automatically when they reach a certain depth, killing those in the water and demoralizing those attempting to rescue them. This problem has been solved in a large measure by medical research. Much work still remains to be done upon the treatment of shock and fatigue.

The medical schools must go on at their increased tempo. The authorities have no intention of disturbing a full time teacher in the medical schools whether he be an M. D. or not. The present medical students will be allowed to complete the three all-the-year sessions and one year as an intern in an accredited hospital. Some nine thousand will graduate next year and twenty-one thousand in the next three years. Large medical meetings will have to be discontinued due to the transportation difficulties and the inability of the doctor to get away from his increased practice. This means that the medical meetings must be brought to the doctor. The local and small societies must carry on and improve their programs. Nothing was said about medical journals.

As yet, the experts do not have the solution for the problem of maintaining the supply of medical students in view of the lowering of the draft age to 18 years. At the Editors' meeting in the evening this subject was again brought up and it was stated that the plan at present is for the youth upon leaving high school to enter upon a thirteen weeks' training period, and during this period the selection would be made of those who were to study medicine, engineering, etc. How this selection was to be made, no one seemed to know. Dr. Fishbein suggested that as good a plan as any would be to select doctors' sons for medicine. At least they would know something of the social and economic problems of medicine. When once selected, they would be paid and uniformed but granted a furlough so long as they did well in their courses.

The problem of providing medical care for the civilian population, especially in the mushroom communities around war industries, was proving to be a bigger one than that of supplying the Armed Forces. One doctor per 1,500 population was considered the minimum standard. The moving population necessitated the dislocation of doctors. This shortage is being met locally in many instances. Dr. Fitzgibbons described the way Portland and Vancouver solved their problem successfully. When it becomes necessary to import physicians, one obstacle that was proving almost insurmountable was the State licensure. It was suggested that these requirements be modified during the war so as to permit the Procurement and Assignment Service to move qualified doctors from one State to another if that seemed to be desirable. Gen. Parran said that if this problem could not be solved locally or by the States, the U. S. Public Health Service would have to detail P. H. doctors. This has been done already in several instances. The P. H. doctors either make no charge for their services or else pool their collections

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and give it to a local medical undertaking such as Visiting Nurses, etc. In speaking of the Procurement and Assignment Service Dr. Lahey was unstinted in his praise of the local men who did all the leg work and received very little praise for it.

NOTE: Since this was written the addresses of Colonel Rankin, Admiral McIntire, Dr. Lahey, and General Hillman have been printed in the *J.A.M.A.*

The Doctor and the War

MUCH has been said of the duties and opportunities of the doctor in this war, but little is said of his sacrifices. In round numbers, one-third, and the best third at that, have gone to war; two-thirds are left to take care of the civilian population.

The third that have joined the Armed Forces are for the most part young men just entering upon their life work in preparation for which they have spent at least seven or eight years of hard and expensive training. In addition, many of them have fitted up offices and have just gotten established. To accomplish this, many have gone heavily in debt. For their country, they are not only undergoing hardships and facing danger but they are giving up careers they have looked forward to all their lives. The Army authorities say they will return them to civil life better doctors than they were, but this is open to question.

The two-thirds that are not wanted by the Armed Forces also have their sacrifices. Many of these had reached a period in life when they felt they could relax a bit and were limiting their work to a field that they particularly delighted in. Now they find themselves hardly adequate to meet the civilian needs and must take up again the day and night grind. The public owes it to these doctors to be as considerate of them as possible in not asking them to do unnecessary work, especially calls out of hours. The doctor owes it to the public to keep as physically fit as he can. He should get as much sleep as possible, not neglect his nourishment, and have a routine physical examination at stated intervals.

Department of Clinical and Medical Education
of the
Medical Society of Virginia

Industrial and Military Medicine.

In cooperation with the Committee on Industrial Health a series of postgraduate courses is now being planned in several sections of Virginia. The program will provide for afternoon, dinner and evening meetings in each of five centers comprising a circuit of a week. Speakers and clinicians of national and state prominence will be obtained to provide the instruction. Efforts are under way to get representatives of the American Medical Association and the United States Public Health Service to participate.

The following subjects among others have been suggested for treatment. Others will be added if local societies wish.

1. A Medical Program for Small Industries.
2. Job Placement of the Worker.
3. The State Health Department and Industrial Hygiene.
4. Industrial Dermatoses.
5. Handling Eye Injuries.
6. Supervision and Treatment of Cardiovascular Conditions.
7. Modern Burn Treatment.
8. Control of Syphilis in Industry.
9. Traumatic Wounds—Infections.
10. Industrial Back Cases—Low Back Sprains.
11. Shock.
12. Fractures and Dislocations.
13. Injuries to Hands and Wrist.
14. The Physicians Place in Industry.

15. Medical Control of Exposure to Toxic Chemicals.
16. Pneumoconiosis.

Courses will begin the latter part of February or early in March. There will be from three to five speakers on each program. Usually there will be two afternoon speakers, a dinner speaker, and two evening speakers. There will be provision for discussion following each speech or demonstration.

In order that programs may be prepared in advance, local societies are requested to notify the Executive Secretary at once if they wish to have a course for their members during the spring or early summer. When requesting the arrangement of a course, societies are also requested to suggest topics they would like to have discussed.

GEORGE B. ZEHMER,
Executive Secretary.

Societies

Williamsburg-James City County Medical Society.

The last meeting of this society was held Friday, November 13, at the Eastern State Hospital, Williamsburg, Virginia, the hospital acting as host to the society.

A delicious supper was served and a scientific program presented by members of the Staff of the Hospital. Included in the program was the presentation of the case of a polyneuropathy of obscure etiology and a case of prefrontal lobotomy.

Because of the tremendous influx of military and defense personnel in the Williamsburg area, the society is having difficulty in obtaining adequate meeting facilities.

I. S. ZFASS,
Secretary-Treasurer.

The Tazewell County Medical Society

Met on November 19 at Tazewell. The meeting was presided over by Dr. M. B. Crockett, president. Dr. Norman G. Patterson of Richlands gave a paper on "Medicine in China" and Dr. W. E. Baker of the State Venereal Disease Control Division showed a sound movie in technicolor on "Syphilis".

Because of very poor interest on the part of the clients of the FSA in joining the proposed medical care project, this project was dropped by the Society. It was felt by the members that it could not be handled successfully on the basis of the very small membership enrolled.

MARY E. JOHNSTON,
Secretary.

Richmond Academy of Medicine.

The annual business meeting of the Academy was held on December 8, at which time Dr. Arthur S. Brinkley succeeded Dr. Beverley R. Tucker as president. The following officers were elected: president-elect, Dr. Emmett H. Terrell; vice-presidents, Drs. T. Neill Barnett and G. R. Maloney. Drs. Harvey Haag and Don S. Daniel were elected to the board of trustees. The usual Christmas party followed in the dining room.

Roanoke Academy of Medicine.

At the meeting of the Academy, held on December 7th, the following scientific program was presented: The Local Application of Sulfonamide Drugs in Diseases of the Tracheobronchial Tree by Dr. Porter P. Vinson; and Observations on Low Back Pain and Sciatica from Pressure on the Lumbosacral Nerves by Dr. C. C. Coleman. Both speakers are from Richmond.

Dr. Paul Davis is President of the Academy and Dr. Ruth Barnhart, Secretary-Treasurer.

News

IMPORTANT NOTICE.

It is of the utmost importance that the Procurement and Assignment Service for Physicians, Dentists, and Veterinarians, immediately has the name of any doctor who really is willing to be dislocated for service, either in industry or in over-populated areas, and who has not been declared essential to his present locality. This is necessary if the medical profession is to be able to meet these

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needs adequately and promptly. It is urgently requested that any physician over the age of 45 who wishes to participate in the war effort send his name to his State Chairman for the Procurement and Assignment Service. Dr. Hugh H. Trout, Roanoke, is chairman of this service for Virginia.

Change in Examination Dates.

Owing to the fact that medical schools of Virginia and many other states have advanced their graduation dates on account of the exigencies of war, the next examinations by the Virginia State Board of Medical Examiners will be held in Richmond, March 24-27, instead of June as heretofore. All applications must be complete in the hands of the secretary, Dr. J. W. Preston of Roanoke, at least ten days in advance of examinations.

Seaboard Medical Association.

The forty-seventh annual meeting of this Association was held in Wilson, N. C., December 1-3, under the presidency of Dr. George Erick Bell of Wilson. Officers elected are: President, Dr. C. Lydon Harrell, Norfolk; vice-presidents, Drs. M. A. Pittman, Wilson, N. C.; H. G. Ashburn, Norfolk; Leslie Lee, Kinston, N. C.; and O. R. Yates, Suffolk; and secretary treasurer, Dr. C. P. Jones (re-elected), Newport News.

Dr. G. B. Arnold,

Who has been connected with the Army Medical Corps as Major since July, 1942, has been discharged from the service because of minor physical disability and as of December 1 resumed his duties as Superintendent of the Lynchburg State Colony.

Dr. D. L. Harrell, Jr.,

Who has been Superintendent of the Lynchburg State Colony during Dr. Arnold's absence, has returned to his former position as Superintendent of the Petersburg State Colony. Dr. Harrell has also been appointed Acting Clinical Director of the Central State Hospital at Petersburg, on a part-time basis pending the return of Dr. L. X. Kolipinski who occupied this position before entering the Army Medical Services.

The State Hospital Board

Announces the approval of a grant from the State Board of Education, through Dr. B. H. Van Oot and Mr. Harold I. Baumes, Supervisor and Assistant Supervisor, respectively, of Trade and Industrial Education. Emphasis in the case of this grant will be placed on service training for hospital attendants and nurses. It is hoped that qualified instructors can be secured and that this work can begin by January 1, 1943. Preliminary to this course of instruction, a survey of the nurse and attendant situation of each of the four mental hospitals will be made in December by Mrs. Laura W. Fitzsimmons of the American Psychiatric Association, and Mrs. Lela S. Anderson, Supervisor of Nurse and Attendant Training for the State Department of Mental Hygiene and Hospitals.

News From University of Virginia, Department of Medicine.

Dr. Alfred Chanutin, Professor of Biochemistry, has received a research grant of $3,000 from the Nutrition Foundation for continuation of his investigation of Fat Metabolism in the "nephritic rat".

The ninth annual post-graduate course in Ophthalmology and Otolaryngology was held at the Medical School during the four days, December 8 to 11. The following lecturers appeared on the program; Dr. H. Marshall Taylor, Jacksonville, Fla.; Dr. D. E. Staunton Wishart, Toronto University; Dr. George E. Shambaugh, University of Illinois; Dean Albert C. Furstenberg, University of Michigan; Dr. Gayle Crutchfield, University of Virginia; Dr. Francis H. Adler, University of Pennsylvania; Dr. George C. Ham, University of Virginia; Dr. Raymond R. Pfeiffer, Presbyterian Hospital, New York City; Dr. Vincent W. Archer, University of Virginia; Dr. Edmund B. Spaeth, University of Pennsylvania; and Dr. Grady Clay, Emory University.

On Monday, November 15, Dr. S. A. Vest, Jr., Associate Professor of Urology, spoke before the Rockingham County Medical Society. His subject was "Endocrine Problems in Urology".

The Exchange Club of Charlottesville has made a gift of $1,000, part of the proceeds from the first Apple Festival, to the William James Rucker Convalescent Home for Children.

Dr. Robert Funsten, as member of the National Committee appointed by the American Orthopedic Association and the American Academy of Orthopedic Surgeons to investigate the Sister Kenny treatment for infantile paralysis, attended the initial meeting in Minneapolis during the week of November 20 to 27.

On Tuesday, December 8, 1942, a motion picture "The Effects of Swimming on the Ear" was presented by Dr. Marshall Taylor of Jacksonvlle, Fla., in the Amphitheater.

On Thursday, December 10, 1942, the Albemarle County and Piedmont Medical Societies met in Room 335 of the Medical School Building. Dr. Lyman Weeks Cresmon of New York City was guest speaker. His subject was "Refrigeration Anaesthesia".

Married.

Dr. James Bannister Stone Perrow and Miss Martha Louise Turner, both of Lynchburg, November 28. Dr. Perrow is a graduate in medicine of the University of Virginia in 1935.

Dr. Thomas Foster Wheeldon, Richmond, and Miss Gladys Pearle Jenkins, Frostburg, Md., December 26.

Dr. David Samuel Garner, Roanoke, and Miss Willyė Mae Webb, Delray Beach, Fla., December 2nd. Dr. Garner is a graduate of the Medical College of Virginia in 1933.

Dr. D. P. Scott

Has been named chairman of the re-organized Lynchburg Tuberculosis Association.

Personnel Notes from Virginia State Department of Health.

Under the recently inaugurated Personnel Lend-Lease Plan, the following U. S. Public Health Service medical personnel have been assigned to duty in Virginia:

Henry B. Makover, Passed Assistant Surgeon (Reserve), U. S. Public Health Service, assigned to the staff of St. Vincent's Hospital, Norfolk, Va.

Catherine W. R. Smith, M. D., appointed Assistant Physician, Bureau of Maternal and Child Health, State Health Department, Richmond, Va.

Dora E. Brault, M. D., assigned to the staff of St. Vincent's Hospital, Norfolk, Va.

Dr. Vernon A. Turner, health officer of Augusta County, has been granted a leave of absence for the duration that he may serve in the U. S. Army, which he entered with the rank of captain in the medical corps. Dr. Thomas Scarlett, Rockingham County health officer, will take over part of Dr. Turner's work, and Dr. H. M. Wallace of Greenville will continue as assistant county health officer of Augusta.

Dr. M. K. Underwood,

Class of '37, Medical College of Virginia, recently located at Belhaven, N. C., announces that he is now in Rolla, Mo.

The American College of Physicians,

Board of Regents, has announced the cancellation of their 1943 Annual Session, which was scheduled to be held in Philadelphia, April 13-16. This action was taken after thoughtful consideration of all factors involved, including an intimation from the Secretary of War and the Office of Transportation that larger national medical groups should not plan meetings at the time set; a growing difficulty in getting speakers and clinicians of top rank to maintain the usual standards of the program; prospect of greatly reduced attendance, because civilian doctors are faced with too great a burden of teaching and practice already; a decreasing active membership, due to approximately 25 per cent of all doctors being called to active military service. President James E. Paullin announced, however, that all other activities of the College would be pursued with even greater zeal, and that the College would especially promote regional meetings over the country and organize post-graduate seminars in the various military hospitals for doctors in the Armed forces.

Urology Award.

The American Urological Association offers an annual award "not to exceed $500" for an essay (or essays) on the result of some specific clinical or laboratory research in Urology. The amount of the prize is based on the merits of the work presented, and if the Committee on Scientific Research deem none of the offerings worthy, no award will be made. Competitors shall be limited to residents in urology in recognized hospitals and to urologists who have been in such specific practice for not more than five years.

The selected essay (or essays) will appear on the program of the forthcoming meeting of the American Urological Association, May 31-June 3, 1943, Hotel Jefferson, St. Louis, Mo.

Essays must be in the hands of the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tenn., on or before March 1, 1943.

The National Society for the Prevention of Blindness

Announces that a prize of $250 will be awarded

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for the most valuable original paper during 1943 adding to the existing knowledge about the diagnosis of early glaucoma. Papers may be presented by any ophthalmologist, student in ophthalmology or research worker of the Western Hemisphere and may be written in English, French, German, Italian, Spanish or Portuguese, but those written in the last four languages should be accompanied by a translation in English. Papers should be in the office of the National Society for the Prevention of Blindness, 1790 Broadway, New York City, by September 15, 1943.

Dr. Walter Glenn Lewis,

Class of '38, Medical College of Virginia, who practiced for some time at Elon College, N. C., is in the Service with the rank of Captain in the Medical Corps and is at present on the surgical staff of the U. S. A. Station Hospital, at Fort St. John, B. C., Canada.

Vitamin Films in Color.

During the past year the three 16-mm. silent motion pictures in color, describing certain vitamin deficiency diseases, which were made available by Eli Lilly and Company, Indianapolis, for showing before medical groups under sponsorship of a physician, have been in continuous demand. One film deals with deficiency of thiamine chloride (beriberi), another with nicotinic acid deficiency (pellagra), and the third with ariboflavinosis. To meet increasingly frequent demands for the films, additional new prints have been placed in circulation and are now ready for loan. The major part of all films concerns the clinical picture presented by the patient with reference to treatment by diet and specific medication. They do not contain advertising of any description, nor is the name of Eli Lilly and Company mentioned.

The films were made at the Nutrition Clinic of the University of Cincinnati at the Hillman Hospital, Birmingham, Alabama, where studies were initiated in 1935, under the joint auspices of the Department of Internal Medicine of the University of Cincinnati and the University Hospitals of Cleveland. Subsequently, these investigations became a co-operative project between the Departments of Medicine of the University of Cincinnati and the University of Alabama, and the Department of Preventive Medicine and Public Health of the University of Texas.

Dr. S. E. Massey,

A member of the Medical Society of Virginia and formerly located in Tazewell County, but more recently of Bramwell, W. Va., and Lakeland, Fla., is now at his winter home in Florida after having been a patient for several weeks at St. Elizabeth's Hospital, Richmond.

Congress on Industrial Health.

The fifth annual congress, sponsored by the Council on Industrial Health of the American Medical Association, will be held January 11-13 at the Palmer House in Chicago. The program has been worked out to show how industrial health services can be extended and improved. There will be a symposium on Infections in Industry, and one session has been assigned to industrial medicine and the emergency. On the last day there will be a round table on Nutrition of Industrial Workers.

These meetings are open to all physicians and others interested in industrial health. There is no registration fee.

Dr. Emmett V. Richardson,

Who practiced at Marion before being ordered to active duty in the Army in April, 1941, was recently promoted to the rank of Lieutenant Colonel in the Medical Corps. He has been connected with the Station Hospital, Camp Lee, since entering the Service.

Dr. Linwood D. Keyser,

Roanoke, was elected a Corresponding Foreign Member of the Argentine Society of Urology, at its annual meeting in Buenos Aires in September, in recognition of original research in this field.

Dr. E. W. McCauley,

Class of '32, Medical College of Virginia, who practiced at Rainelle, W. Va., is now a Captain in the Medical Corps and serving with the 66th Medical Regiment at Camp Barkley, Texas.

"Doctors at War".

The American Medical Association and the National Broadcasting Company, in official cooperation with the United States Army Medical Department and the United States Navy Bureau of Medicine and Surgery, will present over the NBC hookup a radio drama entitled "Doctors at War". This will begin on December 26th at 5:00 P. M., E.W.T., and will be continued for twenty-six weeks, being broadcast on each Saturday at the same time.

Occupational Therapists Needed.

In response to the increasing demand for Occupational Therapists in war time, The Richmond Professional Institute of the College of William and Mary opened a Department of Occupational Therapy in September, 1942. Occupational Therapy, a comparatively new profession, has grown so rapidly since the last war that it has been impossible to supply civilian needs. To help fill this need, the Department of Occupational Therapy in admitting a new group of students in February, 1943. It is hoped that those who recognize the value of Occupational Therapy, and the part which it can and must play in the post war reconstruction, will do all that is possible to interest young women who might be available for service.

Emergency Medical Unit in Lynchburg.

Dr. Bernard H. Kyle has been appointed by the U. S. Public Health Service to direct an emergency medical unit for Lynchburg to care for persons evacuated to that place in case of an attack. Dr. D. P. Scott will be assistant chief. Others named to assist these are: Dr. Elisha Barksdale, Dr. D. M. Thomasson, Dr. John W. Devine, Dr. S. E. Oglesby, Dr. W. Clyde Adkerson, Dr. J. A. Wilkins, Dr. Powell Dillard, Dr. J. H. Hoskins, Dr. H. C. Shotwell, Dr. R. D. Caldwell, and Dr. Walter F. Thornton.

New Books.

The following are recent acquisitions to the Library of the Medical College of Virginia and are available to our readers, the only cost being return postage:

Anderson & Baylous—When doctors are rationed.

Beaumont & Dodds—Recent advances in medicine. 10th ed.

Bennett, G. A. *et als*—Changes in the knee joint at various ages.

Bourne & Williams—Recent advances in obstetrics and gynecology. 5th edition.

Clark, P. F. & A. S.—Memorable days in medicine.

Friedman, R.—Scabies—civil and military.

Gessell, A.—Developmental diagnosis.

Lambie, T.—A doctor without a country.

Langdon-Brown, W.—From witchcraft to chemotherapy.

Piney & Wyard—Clinical atlas of blood diseases.

Werner, A. A.—Endocrinology—clinical application and treatment.

Wintrobe, M. M.—Clinical hematology.

Obituaries

An Appreciation of Dr. Littleberry Stainback Foster.

Dr. Littleberry Stainback Foster, for eight years superintendent of the Eastern State Hospital at Williamsburg, was born in Mathews County, Virginia, February 23, 1856. He was the son of Captain John Foster and Nancy Foster of Mathews County. His father was owner and captain of his own ship in which he twice sailed around the world, doing an extensive merchant shipping business in the far east and other places. On one of these trips Captain Foster discovered in the Pacific a small island—Marquis of Weeks—claimed it in the name of the United States and planted there the United States flag. Record of this discovery may be found in the archives of the War Department in Washington.

Dr. Foster's education was in private schools of his native county, Randolph Macon College, University of the City of New York, the Royal College of Physicians and Surgeons and the Royal Infirmary at the University of Edinburgh, Scotland. He first practiced medicine in Mathews County, where he was prominent not only as a physician but as a citizen, serving at various times as superintendent of schools, member of the Board of Directors of the Eastern State Hospital, and a member of the State Board of Medical Examiners.

On February 1, 1899, he assumed the superintendency of the Eastern State Hospital at Williamsburg, which position he held till February 8, 1907. At Williamsburg he was active in civic and church affairs, serving for a number of years on the vestry of Bruton Parish Church. In 1909 Dr. Foster opened an office in Norfolk and resumed private practice, specializing in psychiatry. He was a member of the Medical Society of Virginia, the Seaboard Medical Association of Virginia and North Carolina, and the American Medico-Psychological Association (American Psychiatric Association).

Dr. and Mrs. Foster, who was Agnes Dixon of Savannah, Georgia, had three sons and two daughters: Littleberry S., Jr., Mary L. (Mrs. Charles Rowan), W. Dixon, Lucile, and Merritt W. Foster.

From the annual reports written by Dr. Foster, one learns that he wrote well and was careful in

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his use of words. His reports indicate that he advocated many years in advance of their adoption in the Virginia hospitals such improvements as separate departments for the epileptics and the tuberculous, a library for patients, an industrial shop ("not as a profitable business but as a valuable means of treatment"), a training school for nurses, and the purchase of 300 or 400 acres of land outside of the city on which to colonize some of the custodial care class of patients. In 1904 he wrote and published in his annual report an important contribution, entitled an "Historical Sketch of the Eastern State Hospital".

Dr. Foster's last years were spent in retirement at his home in the City of Williamsburg, where he died September 23, 1942, in his eighty-seventh year.

It is well that we sometimes pause to give credit to the hospital superintendents of an earlier day. Not infrequently do we discover that one of them here and one of them there is responsible for the firm foundations upon which rest the admirable structures we are wont to look upon as our own.

HUGH C. HENRY, M.D.

Dr. Leverett Saltanstall Early.

Prominent physician of Petersburg, died December 22, after an illness of several weeks. Dr. Early, who was sixty-eight years of age, graduated from the former University College of Medicine, Richmond, in 1898, and shortly thereafter located in Petersburg where he had since made his home. He was active in medical, church and civic affairs of his community, a World War veteran, and served twice as commander of Petersburg Post No. 2 of the American Legion. Dr. Early was also a member of the Sons of Confederate Veterans, and a local surgeon for the Norfolk and Western and Seaboard Air Line Railways. Two sisters survive him.

Dr. John Edward Knight Flannagan,

Marion, died of a heart attack on December 1st. He was born in Charlottesville in 1899 and graduated from the University of Virginia, Department of Medicine in 1925. Dr. Flannagan specialized in tuberculosis and for the past several years had been medical advisor on the staff of the Lee Memorial Hospital and the Southwestern State Hospital at Marion. He had formerly been located at the Catawba and Mt. Regis Sanatoriums. His father was the late Dr. Roy Knight Flannagan who died in June, 1942.

Dr. William Massie Tunstall,

For fifty years a general practitioner of medicine in Nelson County, died at his home near Lovingston, November 24th, after a brief illness caused by a cerebral hemorrhage. Born in Lynchburg, September 21, 1869, he took his premedical education at the University of Virginia and graduated in medicine at the University of New York in 1892. He did post-graduate work at the New York Polyclinic.

Dr. Tunstall was a charter member of the Nelson County Medical Society and one of the most regular attendants at the meetings of that society, serving as its president for a number of years and always taking a great deal of interest in medical affairs and public health in the county. As chairman of the Board of Supervisors he was also chairman of the county board of health. He was a member of the State society and the Association of Surgeons of the Southern Railway System, having served as a local surgeon for that company for forty-two years.

The Nelson County Medical Society has lost a valued and esteemed member in the passing of Dr. Tunstall and its members go on record expressing their sincere sorrow and regret and extending their sympathy to his surviving widow and children.

LYDDANE MILLER, *President*,
J. F. THAXTON, *Secretary*,

Dr. George Hobson Rose.

We have only recently been advised of the death on July 7th, last, of Dr. Rose, retired physician of Zanoni. Dr. Rose graduated from the University of Pennsylvania in 1880 and had been a member of the Medical Society of Virginia since 1888.

Dr. Gray Godwin Holladay,

Portsmouth, died November 26th. He was seventy-two years of age and a graduate of the Bellevue Hospital Medical College, New York, in 1893. Dr. Holladay was in the Naval Medical Corps during the first World War. He was surgeon for the Seaboard Air Line Railway for a number of years and also served as Portsmouth City coroner. Dr. Holladay had been a member of the Medical Society of Virginia for a number of years.